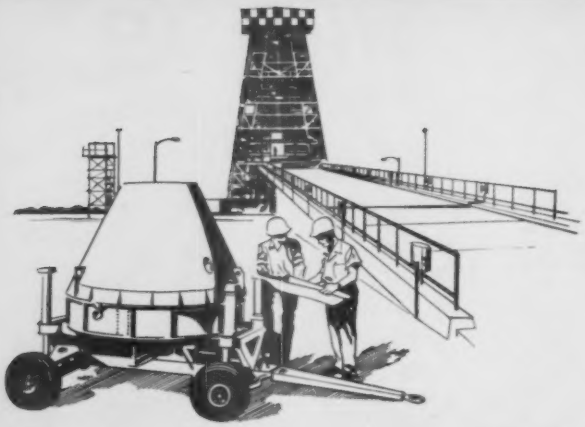
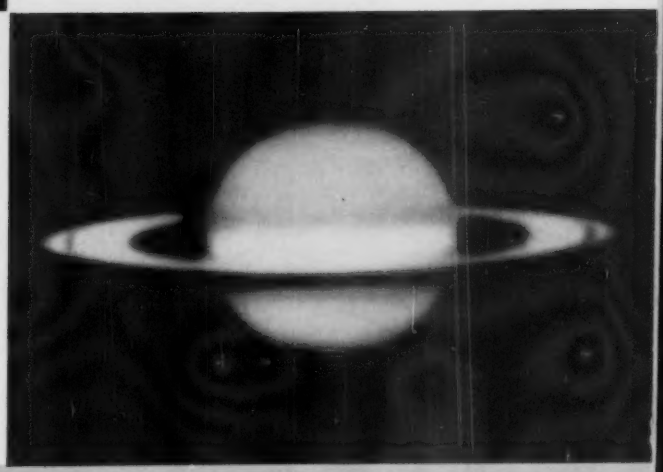
American Engineer

AUGUST, 1958

THE SPACE AGE AND THE ENGINEER

By Senator Lyndon B. Johnson,
Majority Leader, U.S. Senate





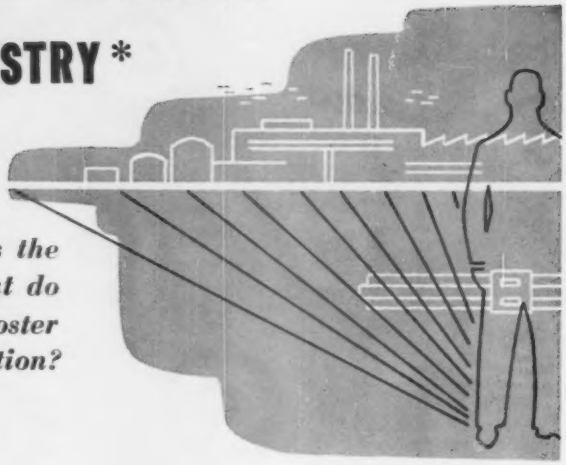
Senator Johnson

In this Issue:

- **Horizons in Engineering**
  by Dr. David B. Steinman, P.E., Consulting Engineer
- **The First Assignment—A Challenge or a Bore?**
  by William M. Redd, Jr., Training Representative, E. I. du Pont de Nemours & Company
- ***Plus:* Many other Features Written Especially for the Registered Professional Engineer**

Executive Research Survey Report

CAREER SATISFACTIONS of PROFESSIONAL ENGINEERS IN INDUSTRY*



What do engineers in industry rate as the most satisfying job factors? What do engineers think management can do to foster professional recognition?

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- **Career Outlook of Professional Engineers**
- **Satisfaction and Frustration on the Job**
- **The Question of Professional Status**
- **Are The Values of the More Successful Engineers Different from the Others?**

* Survey made by the Opinion Research Corporation, Princeton, N. J., for the Professional Engineers Conference Board for Industry, in cooperation with the National Society of Professional Engineers.

Price ("Career Satisfactions of Professional Engineers in Industry"):

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AUGUST

1958

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Knowledge is, indeed, that which, next to virtue, truly and essentially raises one man above another.
—Addison

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NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
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● SPECIAL ARTICLES

The Space Age and the Engineer 11
By Senator Lyndon B. Johnson, Majority Leader, U. S. Senate, and Chairman, Select Senate Committee on Space and Astronautics

Our New Universe of Knowledge 15
By Nathan W. Dougherty, P. E.

The First Assignment—A Challenge or a Bore? 19
By William M. Redd, Jr., Training Representative, E. I. du Pont de Nemours & Co.

Member State Societies' Officers and Directors 22

NSPE Fall Meeting Set October 23-25 in San Francisco 24

An AE Photo Story: No Such Thing As a Skyhook? Here's One Above a Church! 26

Horizons in Engineering 28
By Dr. David B. Steinman, P. E., Consulting Engineer

● REGULAR FEATURES

Letters 4
Professional News Briefs 6
From Washington 17
Engineering Employment Practices Digest 23
NSPE Believes 33
With Our Members 34
With the Auxiliaries 35
Strictly Business 47
Dates to Remember 48
Meetings of Note 49

New Literature 32
Professional Directory 36, 37, 38, 39, 40
Advertisers' Index 40
Classified 49
What's New—New Products of Interest 50

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Letters to the Editor

Superman? . . .

Dear Editor:

In regard to your June issue, "The European Engineer and His Education," I do not feel that we should think of European engineers as the new supermen as long as they borrow money from us and have a lower standard of living.

I believe that AMERICAN ENGINEER could do much in the way of discussion to direct the economic energy of the U. S. toward higher engineering objectives. I think that it is the responsibility of engineers to see that bold projects are developed, if American engineers are to continue to lead the world.

JOE W. ISDALE, P.E.
Houston, Tex.

Schools Give Exam? . . .

Dear Editor:

A statement in the article on "The European Engineer and His Education" by Mr. McCrensky in the June, 1958, issue appealed to me. On page 14, the statement is made, "Studies at German universities are concluded by academic and state examinations."

My question is "Why should not the NSPE promote a similar practice here in the USA?" Let the schools help prepare the student for his EIT examination, and get it behind him prior to graduation.

J. STUART FRANKLIN, P.E.
Hendersonville, N. C.

European Engineer . . .

Dear Editor:

The educational system for engineers in Europe is as much a part of an overall educational program as it is in this country. In each case, it forms part of an integrated system to provide educational opportunities to those deemed qualified.

Mass education, such as practiced in the U. S. A. has never been accepted in Europe. Even in this country mass education beyond the point of benefiting the students (as indicated by students dropping out in high schools, colleges, and universities) has been seriously questioned; and the terrific economic loss of providing educational opportunities in excess of the mental and intellectual capacity of students has been subjected to considerable scrutiny and discussion from time to time.

Education in Europe, or at least in Switzerland where I resided, was a much more serious undertaking than I found it to be in America. Realizing that case studies are subject to criticism as not being truly representative, I would like nevertheless to briefly mention my own case.

There were only two of us students out of a class of approximately thirty students that passed the entrance examination for the "Gymnasium." It was my intention to complete the Gymnasium before entering the Swiss Federal Institute of Technology. However, after 2¼ years at the Gymnasium, we moved to the U. S. A. I had my Gymnasium credits evaluated and found them to be equivalent to four years of high school except for a deficiency in Mathematics and English.

This deficiency was corrected through part time attendance at high school. Subsequently I completed an engineer course (B.S.) in an accedited engineering school. Several years later I had an opportunity of attending some lectures at a Swiss university. Later on, back in America again, and employed as an engineer for several years, I was fortunate enough to receive a fellowship leading to an advanced degree in engineering.

Based upon this and many other experiences I have come to the following conclusions:

(1) The education of the European engineer is a process that is thoroughly established and provides not only professional training, but prepares him for his social position or status as well.

(2) The social implications of an engineering career carry much more weight than in the U. S. A.

(3) "Fundamentals" are stressed at great length.

(4) Training requirements are based more upon development of deductive reasoning and similar processes, than upon "memorizing" certain facts.

(5) Comparison between the training and education of engineers in Europe and in this country is meaningless unless the basic pattern of life of each country is taken into consideration. This is due to the fact that the education of engineers and the status or social recognition accorded them forms such an integral part of a well established and thoroughly accepted pattern of society.

J. C. BILLETER, P.E.
Salt Lake City, Utah

German Grad . . .

Dear Editor:

As a graduate ("Diplom-Ingenieur") from a German Technische Hochschule I have had my share of difficulties explaining that a German Hochschule is not a high-school.

Therefore, it was a double pleasure for me to read the excellent article "The European Engineer and His Education" in the June issue of your magazine.

I believe that articles of this type could help appreciably in raising the academic and professional standards in this country.

There is only one error in the above mentioned article. The abbreviation of the German "Diplom-Ingenieur" is "Dipl.-Ing.," not "Dip.-Ir." Similarly, the abbreviation of the German "Ingenieur" is "Ing.," not "Ir."

WALTER V. MEDENICA, P.E.
Atlanta, Ga.

An American in Paris . . .

Dear Editor:

I read your article "France's Engineer-Executives" appearing in the May issue of AMERICAN ENGINEER with especial detail. May I say that your interpretive report is both enlightening and terse.

I have been working in France for the past six years and am in almost daily contact with French manufacturers, engineers and contractors. Their ethics are above reproach. Their business timidness accurately reflects France's developed culture, political foundation and economic responsibilities. French industrial expansion is almost without bounds. Their potential has not nearly been reached. This applies to both national as well as international production and marketing. We must consider France's terrible manpower toll in two great wars. Also their conflicts in Indo-China and now Algeria. These political conflicts have aggravated the industrial and financial structure. Last year the French franc

(Continued on page 49)

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(Circle 1 on Inside Back Cover)

Want to be an Executive?

Management is actively looking for engineers who have the desire and ability to become administrators

by James M. Jenks

In a sense, this is the golden age for engineers. Once buried in corporate obscurity, many of them have emerged today as likely heirs apparent to the big jobs — and the big rewards — of business and industry. One impressive indication of this growth is that money spent in research and development over the past fifteen years has increased six-fold.

Despite this stepped-up activity, however, the once disorganized scramble for engineers seems to have ended . . . at least temporarily. And perhaps it's a good thing. Actually, the more perceptive engineers had always realized that unusually high starting salaries were often illusory. The gap between money being offered beginners and the incomes of experienced men was narrowing rapidly. Further, more and more thinking technical men concluded that even top engineering salaries are low when compared with the remuneration of highly placed general executives.

A Plan to Help the Engineer Succeed

Happily, there is a route to increased incomes that is satisfying to both engineer and company alike. This route leads into *management*. It is no easy road but the rewards are great for those willing and able to follow it.

In the vast, complicated world of business the engineer has much to learn. As a manager his duties will bring him into contact with accountants and buyers, advertising men and salesmen, lawyers and other executives. A strange new set of circumstances confronts him. He must gain confidences and be understanding, learn and instruct, be sympathetic, paternal or commanding as conditions require . . . and all in the midst of a business organization about which his knowledge is limited.

Actually, it comes down to this: To succeed as a business executive, the engineer must learn the art of making decisions quickly and accurately. And this ability is, of course, directly dependent upon knowledge. The "principles" of business—while not as scientific and inexorable as those of engineering—are no less important . . . no less essential to efficient procedure.

For nearly fifty years, the Alexander Hamilton Institute has specialized in bringing this knowledge to mature men—at home in their spare time.

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We do not claim that you must have the Alexander Hamilton Course in order to succeed in business. But we do say that *you cannot succeed without what is in the Course!*

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All the Institute does is offer you a convenient and time-saving means of bringing this knowledge to you in your spare time; and in a form that has *proved* to be practical and effective.

So that you may judge for yourself whether or not you think the Institute can help you, we have published an informative 48-page book titled "Forging Ahead in Business."

We believe that this little book will help any man get down to bedrock in his thinking; however, there's no cost or obligation for it because—frankly—we've never been able to put a price on it that would reflect its true value. Some men have found a fortune in its pages.

If you would like a complimentary copy of "Forging Ahead in Business", simply sign and return the coupon below. It will be mailed to you promptly.

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PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

AIEE General Meeting Scheduled in August

Sacramento, Calif., will be host to the Pacific general meeting of the American Institute of Electrical Engineers, August 19-22, it has been announced by Charles R. Day, general chairman. Headquarters will be in the Senator Hotel.

The program will include outstanding technical sessions and social and entertainment events.

The general session will include an address by L. F. Hickernell who will assume office as president of AIEE August 1. It will be his first time to preside at an Institute meeting as president.

Inspection trips will be to Aerojet General, where the second stage of the Vanguard missile is produced, Procter & Gamble, the new Folsom Dam and Switchyard, McClellan Air Force Base, and the Army signal depot.

△ △ △

Cultural Background Influences Engineers

The cultural background of a civil engineer can greatly influence how good a job he does designing and building bridges, dams, and highways, according to a University of Michigan professor.

Robert B. Harris, associate professor of civil engineering, said the civil engineer frequently was required to deal with persons unfamiliar with engineering demands.

"It is in establishing a complete understanding between himself and those with whom he works that the civil engineer frequently feels the need for more background in the humanities and liberal arts," he said.

Professor Harris said the University had started a five-year combined program leading to the degrees of Bachelor of Arts from the engineering and literary colleges.

Under the new program, civil engineering students take courses in languages, literature, fine arts, philosophy and history in addition to those in science and engineering.

Dr. Garnet Thomas Page Heads Canada Institute

Dr. Garnet Thomas Page, of Ottawa and Montreal, has been appointed general secretary of The Engineering Institute of Canada, Canada's largest national professional organization.

The appointment was announced by K. F. Tupper, Toronto, president of the Institute. Dr. Page succeeds L. Austin Wright who has retired after twenty years of service as general secretary.

Dr. Page was formerly general manager and secretary of The Chemical Institute of Canada. He joined the Engineering Institute as assistant general secretary in the fall of 1957. He will make his headquarters in Montreal but will be required to travel extensively visiting the fifty branches of the 18,000 member organization.

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J. J. Corbalis Named to Virginia Committee

James J. Corbalis, Jr., engineer-director of the Alexandria, Va., Sanitation Authority, has been named to the State Water Resources Committee by Governor Almond.

The Committee serves in an advisory position to the governor and the State Department of Conservation and Development in matters concerning the promotion, development, and use of water resources for municipal and industrial purposes.

Mr. Corbalis is a past president of the Virginia SPE and a past national director of NSPE.

Survey Shows Demand Still High for Engineers

Demands for June engineering graduates remained at a high level, according to Dr. Henry H. Armsby, chief for engineering education in the U.S. Department of Health, Education, and Welfare.

The survey prepared by Dr. Armsby showed that three weeks prior to graduation seventy-one per cent of engineering graduates either had already accepted jobs or had job offers they were seriously considering. The statistics were based on the reports of eighty-eight college placement officers.

Graduates in other fields from the same colleges were found to be much less in demand; only thirty-six per cent of students in the physical sciences had jobs or serious offers; forty-six per cent of business administration majors, and twenty-nine per cent of liberal arts majors had jobs in the offing.

Among the various engineering fields, civil engineers appeared to be most in demand with seventy-seven per cent of new graduates either with or about to take jobs.

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Traffic Engineering Course at U. of Cal.

Fundamentals of traffic engineering will be covered in a one-week extension course at the University of California, Los Angeles, August 25-29. Designed by the University's Institute of Transportation and Traffic Engineering for engineers having individual traffic responsibility, the course will deal with more than twenty-five individual subjects. Special attention will be given to capacity and to channelization, and a full afternoon will be turned over to signalization, including equipment, systems, and timing.

Early registration is advised, as enrollment may have to be limited. Full details may be obtained from the ITTE at Berkeley. The course is being presented by the ITTE, together with Engineering Extension and University Extension.

Engineering Societies To Vote on Merger

In a joint statement issued by the Councils of the American Society of Heating and Air-Conditioning Engineers and The American Society of Refrigerating Engineers, it was announced they have approved in principle a method of merging the two societies. The ASRE members in attendance at their fifty-fourth annual meeting authorized submission of this proposal for balloting by the ASRE membership.

E. R. Queer, ASHAE president, and Cecil Boling, ASRE president, further announced that present plans contemplate that the proposal for a merger and proxy ballots will be officially mailed to the members of both societies in late October.

Full particulars of the merger plan will be mailed to the members of both ASHAE and ASRE by September. Ballots will be taken in person or by proxy at the forty-fifth semi-annual meeting of ASRE in New Orleans, La., on December 1, and at a special meeting of the ASHAE membership on the same date.

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Electronics Meeting Slated October 13-15

An up-to-the-minute report on satellites and space stations and a discussion of automatic navigation will be featured at the fourteenth annual National Electronics Conference, October 13-15, at the Hotel Sherman in Chicago, Ill.

In addition, there will be a panel discussion on "The Role of the Laboratory Program in Engineering Education" and a session with five journalists covering "Engineering Writing and Speech."

About 100 scientific papers, given by men from sixteen states and three foreign countries, will include such topics as: antennas, audio, communications, computers, engineering management, industrial electronics, instrumentation, amplifiers, microwaves, radar and radio navigation, television and transistors.

A record number of commercial exhibits, highlighted by displays of new electronic developments and devices, is scheduled. There will be social events and programs for wives of men attending.

The conference is expected to attract over 10,000 registrants, principally scientists, engineers, educators, manufacturers and government officials.

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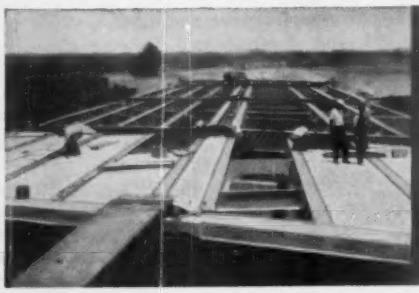

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(Circle 2 on Inside Back Cover)

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(Circle 4 on Inside Back Cover)

AIChE Celebrates 50th Anniversary

The American Institute of Chemical Engineers recently celebrated the fiftieth anniversary of its founding with a week-long Golden Jubilee meeting in Philadelphia, Pa.

One of the features of the session was the presentation of a scroll of greetings from professional societies throughout the world. Garvin H. Dyer, 1957-58 NSPE president, presented a scroll from the National Society to Dr. George E. Holbrook, AIChE president.

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Applications Accepted For NSF Fellowships

Applications will be accepted through September 2, 1958, by the National Science Foundation for a second group of postdoctoral fellowships to be awarded during 1958 in the regular postdoctoral program, Alan T. Waterman, foundation director, has announced. Fellowships will be awarded in the mathematical, physical, medical, biological, engineering, and other science fields, including anthropology, psychology (other than clinical), geography, certain interdisciplinary fields, and selected social science fields. Names of successful fellowship candidates will be announced on October 15, 1958.

To be eligible for these awards, candidates must be citizens of the United States with special aptitude for advanced training and must hold the doctoral degree or have the equivalent in training or experience.

A stipend of $3800 per year will be awarded to successful applicants in the regular postdoctoral program. Dependency allowances will be made to married Fellows. A limited allowance to aid in defraying a Fellow's cost of travel will be paid as well as tuition and fees.

Applications for the regular postdoctoral fellowships may be obtained by writing to the National Academy of Sciences—National Research Council, 2101 Constitution Avenue, N. W., Washington 25, D. C.

Statistics Released on Institute Graduates

America's "technical institutes"—institutions of higher education with programs of less than four years' duration—graduated 11,742 students from engineering-related curricula during 1956, according to a survey made by the American Society for Engineering Education and the U.S. Office of Education.

Total enrollment in engineering-related curricula was 32,498 full-time and 25,124 part-time students in 1956. Of these, 15,491 full-time and 10,646 part-time students were enrolled for the first time during the year.

The survey, first in an annual series, covered 202 schools.

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IRF World Meeting To Attract 50 Nations

Every phase of road construction and the highway transportation field, from modern technological developments like the use of electronics in surveying to fundamental topics like the development of a national highway system, will be covered when the world's foremost road experts gather at Mexico City, Mexico, October 26-31, for International Road Federation's III World Meeting.

IRF is a non-profit service organization which promotes world road-building through its member road associations in sixty-four nations in the free world.

More than fifty nations will be represented by their best road authorities, top government officials and prominent business leaders.

Papers will be presented on highway financing, equipment requirements for construction and maintenance, traffic engineering, highway design, highway administration, soil stabilization, highway economics, planning and directing highway conferences, development of a national highway system, increasing engineering productivity, driver training, the AASHO Road Test, planning, construction and operation of a toll road authority, pavement design, traffic surveys, international highway financing, training of operators and mechanics and road association activities.

Prior to the meeting, groups of foreign engineers will be taken on tours of industrial installations, highway projects, and highway departments from coast to coast in the United States. The trip will start in Washington in late September and end in Mexico City in time for the opening session of the meeting.

James H. McGraw Award Presented to Werwath

The James H. McGraw Award in Technical Institute Education for outstanding contributions to this field of education was presented to Karl O. Werwath, president of the Milwaukee School of Engineering, at the 1958 annual meeting of the American Society for Engineering Education at the University of California in Berkeley.

Nominees for the award are expected to have displayed unusual competence in one or more of the following activities related to technical institute education: instruction, publication or administration.

The citation refers to Mr. Werwath's "intimate, life-long affiliation with technical education. Since he became president of the Milwaukee School of Engineering in 1948, he has provided the institution with aggressive leadership and growth. He continues the pioneering of technical education under the concentric pattern, which includes the technical institute type of curriculum established by his father. As chairman of the Working Group Supporting Technical Personnel of the President's Committee on Scientists and Engineers, Karl Werwath directed the preparation of the Group's report, which is significant to business, government, and industry. Through his deep sense of personal dedication and his unswerving pursuit of ideals and objectives, Karl O. Werwath has made an outstanding contribution to the progress of technical institute education in the United States."

Mr. Werwath is an NSPE member.

△ △ △

Gustat New Head of Industrial Engineers

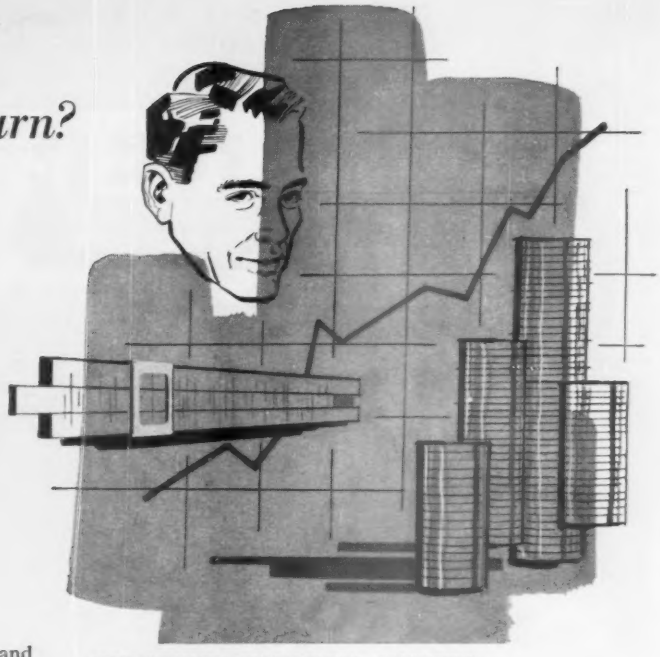
George H. Gustat, director of the industrial engineering division at the Kodak Park Works plant of Eastman Kodak Company, has been elected president of the American Institute of Industrial Engineers.

Mr. Gustat's formal acceptance of the post for the 1958-59 term took place at the Institute's ninth annual convention in the Hotel Statler, Los Angeles, Calif. The engineering group, with more than 150 chapters in the United States, has a membership of more than 8,000 persons.

The Kodak official has previously served the Institute as a member of its planning committee, director of public relations, and as president of the group's Rochester, N. Y., chapter.

what do engineers earn?

PROFESSIONAL ENGINEERS INCOME & SALARY SURVEY—1956



Here is the latest in a continuing series of Income and Salary Surveys of the engineering profession made by the National Society of Professional Engineers. Started in 1952, the Surveys are part of a long-range income and salary study program. This third biennial Survey presents up-to-date information gathered from engineers throughout the country, in all the engineering fields. The Survey gives a detailed picture of engineer earnings by year of entry into the profession, by geographical region, by type of employer, by engineering specialty—and by a variety of other categories. Salary and income data from more than 17,000 registered, professional engineers were studied for this newest Survey report. Published in handy booklet form, the Survey provides a documented study at all levels of professional experience. Comparative earning figures from the 1952 and 1954 Surveys make it possible to evaluate broad engineering income and salary trends for the period 1952-56. A vital research study for engineers, industrial executives, personnel officers, and all others who want the facts on engineer earnings.

GET SOUND STATISTICAL ANSWERS TO THESE QUESTIONS

- ► Which of the major engineering specialties has the highest median earnings?
- ► In what fields have professional engineers achieved the largest gains in total earnings over the period 1952-56?
- ► How do engineering salaries compare in the fields of education, public utilities, industry, government and private practice?
- ► How much, percentagewise, have engineer earnings increased throughout the country during the period 1952-56?

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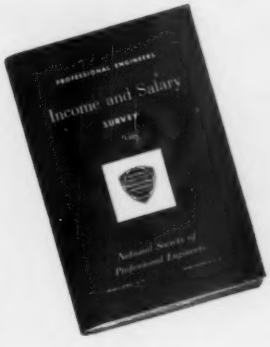

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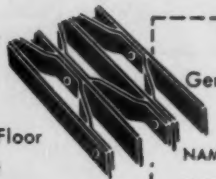

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American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-EIGHT NUMBER 8

The Space Age and the Engineer

By

SENATOR LYNDON B. JOHNSON

Majority Leader, U. S. Senate, and
Chairman, Select Senate Committee on Space and Astronautics

An Air Force Thor, intermediate range ballistic missile, lifts from the launching pad at the Air Force Missile Test Range at Cape Canaveral, Fla.

I BELIEVE we are badly underestimating the Space Age.

This is not a technician's judgment, certainly not the evaluation of a scientist—for I am neither. It is, instead, a personal evaluation of a national attitude which is reflected to Washington from over the nation, and, quite probably, an attitude which is seemingly reflected from Washington back to the nation.

The Space Age began last October with the launching of Russia's Sputnik I. Much has happened since then. Our own satellites have been placed in orbit, countering the Russian challenge. There have been plans made for a variety of more imaginative feats. Both houses of Congress have approved bills authorizing the establishment of a high-ranking space agency to foster and direct our activities in this field.

Much has happened—yet little has happened.

The technical achievements since last October represent more the proving of technology already perfected—or near perfection—at the time the Space Age burst upon us. Net gains beyond that point have been modest. This is said, not in criticism, but for perspective.

Our attention, thus far, has been devoted to space vehicles. Popularly and politically, almost the entire space vocabulary is confined to such vehicles: satellites, missiles, space stations, and the related technological. This is misleading. It could be adverse in its consequences.

Since last October, I have been close to our space program, first as chairman of the Senate Preparedness Subcommittee which investigated—from the security standpoint—the conduct of our pre-Sputnik work, and, secondly, as chairman of the Select Senate Committee on Space and Astronautics which wrote the Senate version of the bill

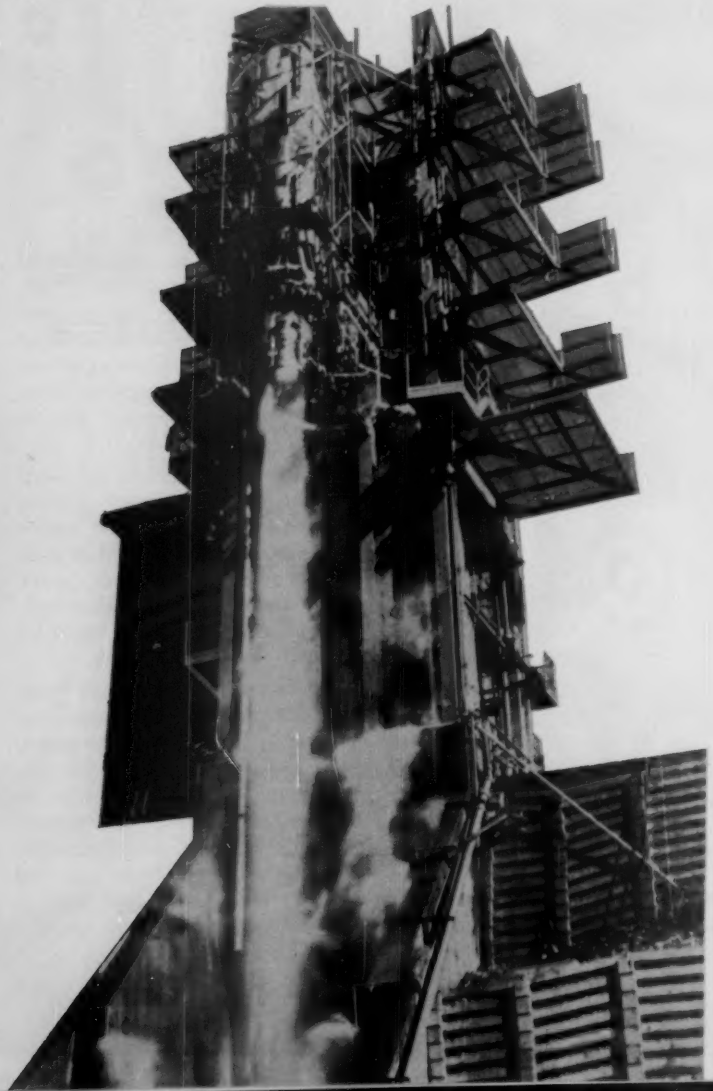
Impenetrable clouds that never permit view of Jupiter's surface are indicated by the horizontal marks of "latitude" seen in photographs of the Sun's largest planet. These belts of alternate light and dark change shape and position, as does the Great Red Spot, upper left, that has baffled observers since its discovery in 1878.

—Copyright, Mount Wilson and Palomar Observatories

The atmosphere of Mars shows unusual belts of clouds in this 1954 photograph made by Dr. E. C. Slipher, leader of the National Geographic Society-Lowell Observatory Mars Expeditions to Bloemfontein, South Africa.

—Copyright, National Geographic Society

Fiery gases stream from a Redstone rocket engine below, as it delivers more than 75,000 pounds of thrust during a static test at Rocketdyne's Propulsion Field Laboratory near Los Angeles.



creating a civilian-controlled space agency.

Security has been our first and most immediate concern, and I think this is proper. But, while I have no personal background of technical training, I feel keenly that our tendency to talk of the vehicles of space—satellites, missiles, etc.—demonstrates a limited vision and limited conception of what we have entered.

The ultimate of space vehicles is the transport of man through outer space near or to the moon, some of the planets, perhaps even to other galaxies, so some predict. I have no doubt that this will come eventually, probably far sooner than we anticipate. Whatever the date, manned space vehicles will be —when they come—far more of a detail, far less a pinnacle of accomplishment than we now think.

Long before space travel is feasible or commonplace, the Space Age will have upon us—and how we live and work—an impact of the greatest force. This is the area in which we are now, I believe, underestimating the meaning of this whole new dimension of human experience.

SPACE technology is not, in the first instance, one and the same with military technology, anymore than the technology of motor transport, piston-driven flight, or jets has been a field of military exclusiveness or preeminence. If anything, the reverse is true.

I believe the technology of space will have the most profound impact upon civilian affairs and concerns, far more than upon the military.

As an example, the clear potential of space which we can already see so distinctly is a veritable revolution in communication—such things as internation and intercontinental television will become feasible. The range of radio will be vastly increased. Great corollary advances will come in such things as rapid coding and decoding, permitting the dispatch of volumes of information at almost instantaneous speeds.

Similarly, there is equal potential in many other realms. Weather control, climate modification, etc., are among those most often cited.

There is no need to attempt a full listing.

The challenge presented is—to my mind—a particular challenge to engineers.

The next fifty years quite likely will be the most inventive years of human history. We have broken across a frontier, the first new physical frontier to be opened since the American West. As the opening of the West evoked the Golden Age of American Invention, so the opening of space will evoke a corresponding world-wide age. America's strength may well relate to the ability of our engineers to make meaningful application of the potential of this inventive era.

The profession itself will be especially challenged to meet a new level of imaginativeness, vision, and understanding of the opportunities afforded. The pace will be quick. The demands exacting.

What are some specifics?

The Space Age will produce an outpouring of new materials with which to work. In the field of metallurgy alone, the Space Age will work a revolution. Our vast increase in consumption of raw resources of all kinds will tax the ability of the engineer to find new ways to feed the appetite of an expanding economy. The world will be farming the sea-beds and finding valuable uses for now valueless substances within a generation, and the engineer will play a decisive role in our success at these necessary new ventures.

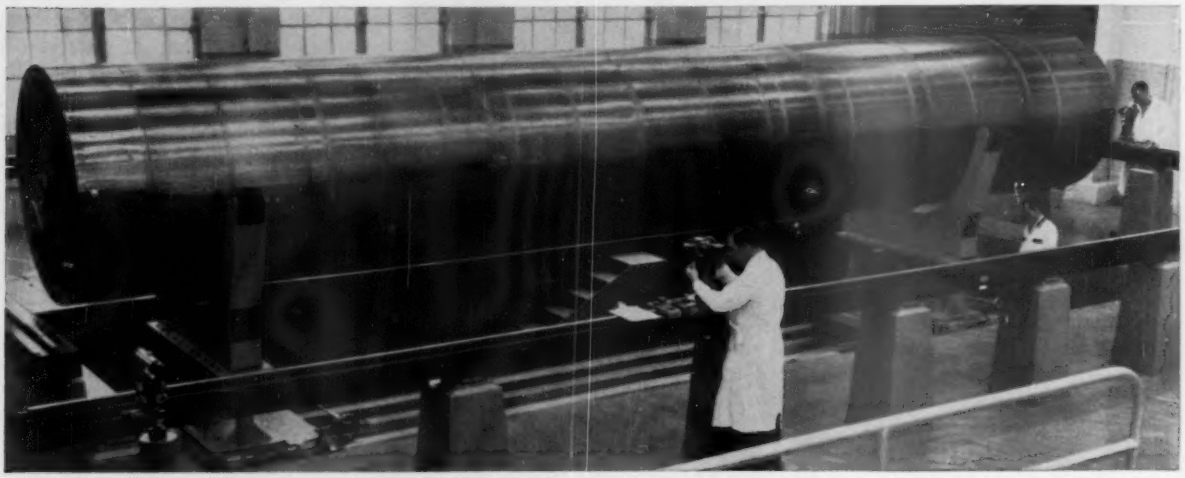
The productive economy we have now—and on which we have laid so much stress for so long—will undergo subtle changes. Many new industries, such as in fuels, will rise, while some old and presumably basic industries may wane. Along the way, there will be a process of rapid attrition by obsolescence—whole new industries will be born, live, and die in less than a decade. This will present a particular challenge to the engineer to make possible the rapid transitions and transformations.

In the period ahead, it is foreseeable that we will have in the United States a period of accelerating mobility of the populace—which, of course, will mean far more building, new building, than in any past period. The same will be true of the world at large, as today's underdeveloped nations acquire greater and greater independent status economically.

These considerations—and many others—are why I say that we are underestimating the Space Age.

THUS far, there has been a popular reaction that the Space Age is predominantly—or, at least, initially—a military concern. That is not true. The cart is before the horse. It is probable our civilian economy, civilian productive machine, and even our civilian life will feel the impact of the Space Age far, far sooner than most Americans are now estimating.

There should be a great rushing forward from industry and business and engineering and science to explore the implications of this Age. There is interest, of course, but there has been less of the zest and exuberance and eagerness than the opportunity justifies.



The long aluminum center section containing fuel tanks for the first stage of the Army's Jupiter-C missile is checked in the optical inspection dock at the Reynolds Metals Company missile plant, Sheffield, Ala. Engineers use optical instruments, similar to surveyors' transits, to check the dimensions, the straightness of the shell, the location of mounting and connection holes and location of mounting pads.

I am hopeful that when the space agency is finally established and in operation it will result in clearer understanding of the potential involved and that this exuberance will flourish. Ideally, though, it would be preferable for such an agency to function as a coordinator rather than as a rallying-center, trying to stir interest alive.

Engineering—and the sciences—have a great stake in their initiative. Obviously, there is the most serious national interest in engineering and science now. It is one thing, however, to have the government coordinating effort and quite another to have government concerned with inducing effort. I believe our security will be made greater—and the freedoms of our technical professions made more secure—if it is unnecessary for government to enter the role of prompting

This is an enlargement of a small section of a test run photo made by the "Big Schmidt" photographic telescope. It shows a portion of the Milky Way in the constellation of Monoceros.

—Copyright, National Geographic Society

Closest to the earth and more like it in brightness and probably in climate than any other planet, Venus is our evening star when she draws near every eighteen months. Because her orbit lies between sun and earth, Venus reflects varying segments of light as she exposes sunny side or dark.

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creative effort by our engineers and scientists.

The profession will best fulfill that obligation by leading the government – civilian or military – rather than being led by it.

Creation of the space agency means a new status in governmental policy-making for men of engineering and science. I hope that it does not mean, also, a new status for the professions as professions tied too closely to government direction.

How can this be assured?

Thus far, our experience with the Space Age has been, to an unfortunately large extent, competitive in spirit—we have been engrossed in a "race" with Soviet Russia. This has led us to use Russian attainments as mileposts in measuring our own gains. Such a course, if much prolonged, could lead to tragedy.

The United States must run its own course and its own race, setting the pace rather than have the pace set for it. Here is the greatest challenge of all to the engineer and the scientist.

Engineering and science now are elevated, properly, to a role of preeminence in importance to our national policy and our national position. Yet the men who make that policy—in Congress, in the military, and elsewhere—are, ofttimes, unacquainted with these fields, as members of the professions may not be acquainted with the considerations of public policy-making.

There is a most serious and immediate need to bridge the gap, establish better communication, deeper understanding, fuller cooperation. More important, the engineer and scientist must set the forward pace by their own free effort rather than leaving the pace to political determination and demands.

It is imperative that engineers, as a profession, not underestimate the potential of the Space Age, just as such is true for the government official, Senator, Congressman, businessman, educator, or other. Equally, it is imperative that the engineer, also, not underestimate the new demands imposed upon him to be alert to the responsibilities of his new position as one of the cornerstones of our security and our freedom.—**End.**

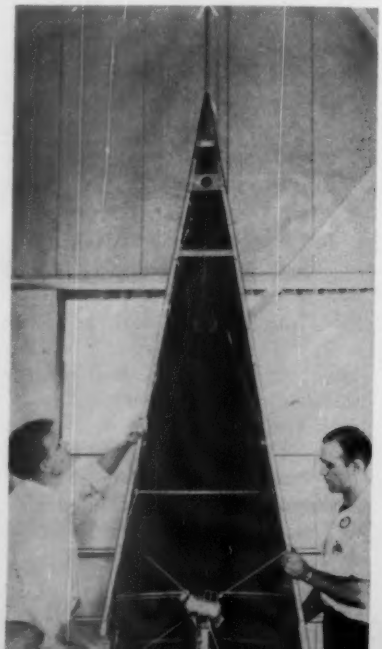
About The Author . . .

Sen. Johnson

Lyndon B. Johnson, Senate Majority Leader, was born at Stonewell, Texas, in 1908. He holds a B.S. degree from Southwest Texas State College, and has attended Georgetown Law School. After a brief career in Texas, including teaching in the Houston public school system, he entered public life in the early 1930's. In 1937, he was elected to the 75th Congress to fill the seat left vacant by the death of James P. Buchanan. He was re-elected for five successive terms. He was a successful candidate for the Senate in 1948 and was overwhelmingly re-elected in 1954.

Senator Johnson is chairman of both the Senate Preparedness Committee and the Select Senate Committee on Space and Astronautics. He is a member of the Senate Armed Services Committee and the Senate Appropriations Committee.

Martin Company engineers inspect half of the plastic phenolic nose cone shell which will protect a 6.4-inch test satellite in its ascent through the atmosphere. The two halves open like a clam shell and are ejected early in flight well before the satellite is injected into its proposed orbit.



*Acceptance Remarks . . .**

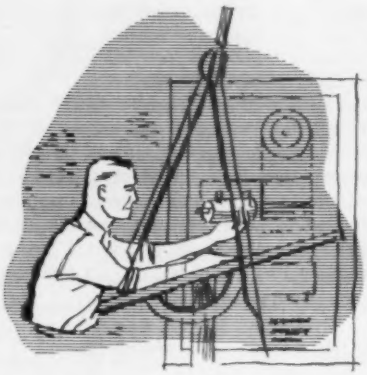
Our New Universe of Knowledge

By

NATHAN W. DOUGHERTY, P. E.

Dean Emeritus of Engineering, University of Tennessee

DURING the last few decades we have realized that *research and development are the endless frontiers of the future*. In the thirties we were sad that the land frontiers were gone and we were doomed to live in a mature economy of maintenance and of depleted natural resources. We were solving our problem by making work, handing out doles, going back to hand tools and trying not to "fear fear;" we were trying by palliatives to solve a world problem. Some even suggested that we take a holiday in science and technology.



What may we say is typical of the new horizons? Is it atomic fission? or jet propulsion? or space travel? or does Polomar give us the glimpse we are seeking to interpret? As I study the pictures taken at Polomar my imagination takes flight to the fartherest star and there it says: "Increase the light and we increase the circle of darkness." Each new discovery gives a hint of the other mysteries which lead us on to the limitless horizons. At the turn of the century Simon Newcomb wrote a book on astrology in which he estimated that the fartherest star was some four thousand light years away; astronomers at Polomar estimate that they have pictures of stars whose light has been traveling four million years, yes, maybe more than a thousand times more. These are dimensions which baffle the imagination of disciples of Jules Verne, or the prophet who said: "Your old men shall dream dreams and your young men shall see visions." Sometimes we fear that our generation is not as hardy as that of our forefathers. Mad Anthony Wayne was asked by General Washington to storm a strong British position, he said: "I will storm Hell if you will plan it." His descendants in our day are not only willing to storm the nether regions, but they are hoping for the time when they will sail for the moon, or to outer space.

Increase the range of our vision and there are new horizons beyond; decrease the field of view, but increase the light and we discover new living cells that are exceedingly small and as we go further and further we find the atom charged to overflowing with energy, indeed, it is energy itself.

On every hand we find encouragement to go on and on. The achievements of half a century teach us that we are just at the beginning of a new universe of knowledge and power. As we look about we find certain hurdles which tend to block our way and cause us to see dimly the new and greater horizons. We will name three.

First on our list is the fear of technology. In the thirties we talked about the Frankenstein monster; we made motion pictures of him which made us fear ourselves and our machines, and we thought he might turn some day and destroy us. Some wrote books: *The Threat of Leisure*, *The Failure of Technology*, *Frankenstein*, the *Planned State*, and others, and we tended to forget that this has always been a common fear. When Prometheus brought down fire to man, he was bound for a thousand years, because he had made it possible for me to be like gods. Always there has been the fear that man's creation would rise up and enslave him. Someone has already suggested that the duty of man is to beget machines which will take the place of other machines which have already enslaved him.

A FEW weeks ago I heard a speaker make the statement that if we are not a part of the solution of the problem we are a part of the problem. If we believe that machines will enslave men we are a part of the problem and not a part of its solution.

The second fear is that of insecurity. We want things to remain as they are; we fear changes which come in any age. To realize the new horizons we must accept change and project ourselves into a new day.

At the present time the horrors of insecurity, as exemplified above all in mass unemployment, have

(Continued on page 42)

*These are remarks made by Dean Dougherty when he accepted the NSPE Award for 1958 at the recent annual meeting of the Society in St. Louis.—*Editor.*

Amendment to Taft-Hartley Act Protested by Society in Letter

In a letter to members of the House Education and Labor Committee, the National Society has protested language in the Kennedy-Ives Labor Reform Bill which could prove seriously detrimental to the separate voting rights presently granted professional employees under the Taft-Hartley Act. The Kennedy-Ives Bill has passed the Senate by an overwhelming 88 to 1 vote, and at the present time remains on the desk of House Speaker Rayburn where it has not yet been referred to the House Labor Committee. There have been reports of a move to bypass the House Committee and bring the bill directly to the House floor for debate.

The provision in the bill unacceptable to the National Society would amend the Taft-Hartley Act by permitting employers in the building and construction industry to execute contracts with labor unions covering existing or future employees, without there previously having been an election by secret ballot to determine the employees' choice of a collective bargaining representative. The National Society views this language as a potential threat to professional employees who could be swept into a heterogeneous unit for collective bargaining purposes contrary to the explicit provisions of Section 9(b)(1) of the Taft-Hartley Act. This section grants professional employees a separate vote in order to determine their desires regarding representation in a mixed unit.

The Society's letter invited the attention of the Committee members to the fact that under the existing language of the Kennedy-Ives Bill "there would be no NLRB certification in which the Board could expressly state that professional employees were not to be covered by a collective bargaining agreement contrary to their wishes. Rather, the proposed language would sanction an agreement under which professional employees could be forced to join and be represented by a union whose experience and interests are not geared to adequately speak for professional employees with backgrounds, abilities and work output distinguishing them from employees who are not professional."

The Kennedy-Ives approach to solve the peculiar problems in the building and construction industry is contrary to the position previously taken by the Administration and Senator Kennedy himself, the Society's letter told the Committeemen. Earlier, Senator Smith of New Jersey, as spokesman for the Administration, and Senator Kennedy had introduced proposals which provided that the NLRB could certify unions as exclusive collective bargaining representatives in the building and construction industry without the necessity for the Board to have previously conducted an election by secret ballot. The National Society had questioned that applicability of the certification-without-election procedure to professional employees and was assured by both the Department of Labor, through its Solicitor, and by Senator Kennedy that such a procedure was "not intended to affect the present self-determination rights of professional employees provided in Section 9 (b)(1)." Now, however, the Society warned, since the Kennedy-Ives proposal completely changes the earlier recommendations, professional employees in the building and construction industry are left "without that measure of confidence engendered by responses received from the Department of Labor and Senator Kennedy."

NSPE urged that the Committee hold hearings so that the opposed language in the bill can either be deleted or amended so as not to impair the rights of professional employees.

Discrimination Charged By National Society

"Ironclad discrimination" against the engineering profession on the part of the Wage and Hour and Public Contracts Division of the Department of Labor has been charged by the National Society.

The NSPE criticism was expressed in an 8-point rebuttal of a recent report by a Wage and Hour hearing officer concerning testimony presented by the National Society which recommended including professional engineers registered under state law in the same category as licensed doctors of medicine and lawyers who are excepted from the minimum salary requirement.

The National Society's recommendation was rejected by the Wage and Hour and Public Contracts Administrator.

In a rebuttal statement to the Administrator, NSPE Executive Director Paul H. Robbins declared that "it is difficult for us to understand how the profession of engineering can be recognized, praised, hailed and commended for its contribution to the nation's welfare and defense by eminent leaders of Government from the President, the Congress, and departmental and agency heads, on the one hand, and made the subject of an obvious and unwarranted discrimination compared to the other professions by the Wage and Hour and Public Contracts Division, on the other hand."

Secretaries Meet in Washington

Shown at a recent meeting in Washington of full-time state society secretaries are, standing, l. to r.: Stephen A. Derry, Iowa; W. L. Sweet, Indiana; J. A. Sontheimer, California; Ross B. Johnston, West Virginia; Robert J. Newbury, Minnesota; Paul N. Doll, Missouri; Llewelyn M. Reed, Connecticut; John T. West, Jr., Pennsylvania, and Lloyd Chacey, Ohio. Seated, l. to r.: M. A. Woodbury, Oklahoma; Charles J. Dodge, New Jersey; Paul H. Robbins, executive director, NSPE; Miss Martha Collins, New York, and Gus F. White, Texas.

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

P.E.'s IN CONSTRUCTION INDUSTRY THREATENED BY LABOR REFORM BILL

ONE of the strange anomalies of the current legislative situation revolves around a bill which started out to prescribe some medicine to cure some of the more flagrant abuses of power by union leaders, as disclosed by the hearings before the McClellan investigating committee. There was rather general agreement that reform legislation was needed, and not too much disagreement about the approach through mandatory reporting and disclosure of certain facts about unions and their financial and administrative operations.

From this clear and worthy purpose the legislative picture has progressively deteriorated, until today there is the most serious concern on the part of many elements of the public that the bill, if passed, would do more harm than good. The reason for this unhappy situation is, in essence, the inclusion of certain changes in the basic labor law which are highly controversial and, in some cases, appear to be attempts to put through labor law revisions as part of a "package" which could not be passed on their own merits. The labor reform bill now includes, for instance, provisions regarding granting a vote to economic strikers, changes in the definition of "supervisor," pre-election hearings by the NLRB, and other issues not germane to the labor racketeering problem.

A further unrelated part of the legislation is of the utmost concern to the engineering profession, and particularly to professional engineers employed in the construction industry. In brief, the issue on this point is whether professional engineers in the construction industry are to lose their present legal right of self-determination with respect to union representation. If the bill should pass in its present form that would be the result.

The Taft-Hartley Act has not been a "practical" law for the construction industry—at least the unionized portion of the industry. As explained by the Senate Labor Committee: "The industry is quite different from most manufacturing and service industries. The individual employee does not have a fixed relationship with the employer. Employment is intermittent and jobs are frequently of short duration." The Committee then explains that many attempts have been made to deal with this situation by providing some mechanism to get around the general Taft-Hartley requirement of an election prior to certification, which is not feasible because of the intermittent nature of the employment. Also, the custom of the industry to enter into collective bargaining agreements with the craft unions before the work is begun or before any employees are hired is inconsistent with the rule that exclusive collective bargaining contracts can lawfully be concluded only if the union makes its agreement after a representative number of employees have been hired.

In March, 1957, the Administration offered its proposal to deal with the peculiar problems of the construction industry. It proposed, after consultation with representatives of the building trade unions and the construction contractors, that the NLRB be permitted to certify building trades unions as exclusive bargaining representatives without a prior election, on the basis of a joint petition by the employer and union involved asserting present recognition of the union by the employer as the bargaining representative of his employees and the existence of a collective bargaining agreement between them. A certification would not be allowed, however, if there was no history of a collective bargaining relationship between the union and the employer prior to the current agreement, or if there was an allegation and the NLRB found that a substantial number of employees in the unit in question asserted that the union was not designated or selected as bargaining agent by a majority of affected employees.

There was considerable merit to this carefully-developed approach and it appeared that finally some mutually acceptable solution would be found to the unique problems of the construction industry. A review of the proposal by appropriate NSPE committees indicated that there was some question as to how the arrangement might affect professional engineers in the construction industry because it was worded to apply to *all* employees. An exchange of correspondence with the Department of Labor resulted in a declaration by Stuart Rothman, Solicitor of Labor, that the proposal "is not intended to affect the present self-determination rights of professional employees provided in section 9 (b) (1). There would be no greater possibility, under the proposed amendment, of professional employees being included in a bargaining unit against their desires than there is at the present time."

The Department of Labor comment was brought to the attention of Senator John F. Kennedy, chairman of the subcommittee considering labor legislation. The Massachusetts Senator replied to NSPE that he agreed with Mr. Rothman's statement that the construction industry amend-

ment would not sweep professional employees into trade unions against their will. It would have been preferable, of course, in the NSPE point of view, to include specific language excluding professional employees from the proposed procedure, but at least there was some reasonable assurance from responsible officials that there was no intent to include professional employees. This assurance was worth something because the NLRB would issue a certification spelling out the scope of the unit. Should the NLRB entertain the idea of including professionals the Rothman and Kennedy statements would have been strong arguments against such arbitrary action.

cost of a possible shutdown, slowdown, or other expensive retaliation for his refusal to "cooperate." Under the present law the contractor may not force his employees into the union at the risk of being charged with an unfair labor practice along with the union. This was the situation in the Ohio Turnpike Case a few years ago. It was also the situation more recently when the NLRB ordered a California local of the operating engineers union and two contractor associations to stop activities intended to coerce engineering and technical employees of a subcontractor into joining the operating engineers' unions. This protection would be lost under the Kennedy-Ives bill.

◄ Senator John F. Kennedy of Massachusetts

Rep. Graham A. Barden ► of North Carolina

This entire picture took on a new and totally different complexion, however, when the Kennedy-Ives labor reform bill came before the Senate. In a switch of tactics, which the Senate Committee didn't even bother to explain in its report, the NLRB certification approach was dumped and the unfair labor practice section of the law was made the vehicle. Under this arrangement the employer and the union could make an agreement covering present and future employees of the construction contractor even though the majority status of the union had not been established under Section 9 (which includes the professional protection provision), and the agreement could require membership in the union after the seventh day of employment or the effective date of the agreement. Shorn of its legalese, the construction industry amendment as passed by the Senate would permit professional engineers employed by construction contractors to be forced into a building trade union with no remedy under the law. The assurance given by the Department of Labor and Senator Kennedy would be meaningless under the Senate provision because it was based on a different procedure involving an actual certification.

The danger is not fanciful or imaginary. There have been several actual cases in which a building trade union has demanded that engineering employees join the union, "or else. . . ." The contractor can refuse to knuckle under and take the "or else. . . ." But as a practical matter the contractor rarely, if ever, is willing to play the role of a martyr to protect a relatively few professional employees at the

At the moment, the Senate-passed bill is lying on Speaker Sam Rayburn's desk and has not been referred to the House Labor Committee. The political climate is such that the bill, with its many objectionable features, would likely not get out of the House Committee if it is referred to that body. There is some evidence that an attempt will be made for an end-run around the Committee and a direct vote on the House floor—a most unusual procedure and one that would require an affirmative two-thirds vote. Although this seems hardly possible in the face of developing opposition to the "reform" bill, NSPE has called upon Chairman Graham A. Barden of the House Committee to insist upon having the bill sent to his Committee for hearings. The danger the Kennedy-Ives bill contains for professional engineers in the construction industry has been brought to the attention of all members of the House, and the NSPE-affiliated state societies and chapters have been asked to contact their Representatives to bolster the demand for a thorough review and hearings by the House Committee before the rights of some professional employees are thrown out of the window. Individual members of the Society now have the opportunity to play their role in protecting and advancing their profession by "speaking up" to their Congressman. Although relatively few of the profession may be affected by this particular departure from professional rights, it is a case in which one of the fundamental principles of unionism can be applied to professionalism—"an injustice to one is an injustice to all."

The First Assignment— A Challenge or a Bore?

By

WILLIAM M. REDD, JR.

Training Representative, E.I. du Pont de Nemours & Co.

THIS year, as every year, employers of engineers are faced with the problem of how to introduce newly hired graduates to industry. Some corporations handle the problem by establishing formal training programs. For most employers, however, the procedure is not so clearly defined. Many follow the path of least resistance: assigning new men to the projects which have the most acute shortage of manpower and hoping the supervisors will do a good job of breaking them in. Actually, the problem of getting new engineers off on the right foot demands the best efforts of their employers; any other path leads to frustration and expense.

The early stages of a young engineer's career are critical. His early satisfaction or frustration colors his attitudes toward his employer and his profession throughout his career. Since professional satisfaction stems in large measure from a sense of professional competence, an employer must create conditions that enable each young engineer to perform successfully in his first assignment. The achievement of this goal demands a carefully considered management decision in the selection of the new man's supervisor and job assignment. It also requires the application of supervisory coaching of the highest order.

The transition from campus to industry tends to make the new men unhappy, frustrated, and apprehensive. In school, the student can see where he will be and what he will be doing for some time in the future merely by reading the catalog. Professors tell him what each course will cover; he knows when and how he will be graded and how much is expected of him. In other words, he knows where he is going and how he is going to get there.

In industry, on the other hand, the average new man has no idea where he will fit into the organization. He does not know what he is expected to do nor what standards he will be required to meet. He is not at all sure that the theories he has learned in the classroom and laboratories will have any application in the manufacture of safety pins or fertilizer or locomotives. While he welcomes challenge, he fears defeat; while he is confident of his ability to solve textbook problems, he worries over the lack of industrial textbooks.

This fear of the unknown is very real to the new graduate. It is for this reason that selecting a new man's first productive assignment and his first supervisor are such critical management decisions.

To create a favorable climate, the supervisor of a recent graduate must be aware of the drives and fears of his man. He must show him what industry expects of him and how he is to proceed. Above all, he should do everything within his power to help the new man develop competence in his new assignment.

THE responsibility for developing competence, of course, rests squarely on the shoulders of the new engineer. He must recognize this fact without reservation. He should also understand, however, that his management and supervision are anxious to provide the assistance required to enable him to acquire competence. This poses problems for management: Precisely what should result from a new employee's first assignment? What should he learn? What productive work should he perform? What changes should take place in his attitudes? What application of academic theory to industrial practice should he be expected to make?

Under the guidance of an understanding supervisor, the young engineer develops into a competent, confident contributor and leader.

On the job, the engineer's first supervisor provides support and help, but must avoid "spoon-feeding" or too close surveillance. To create a favorable climate, the author states, the supervisor must be aware of the drives and fears of his man. He must show him what industry expects of him and how he is to proceed.

For business to prosper and the individual to gain self-respect, each employee must pull his weight. This means management must define clearly the production requirements to be met by each new employee. In non-repetitive, unstandardized work such as engineering, the application of production standards, yardsticks, quotas, and other techniques is impossible. An atmosphere should be created, however, in which the new man realizes that he is expected to produce as well as learn. He should also understand that his production is being observed by competent judges and that he will be rewarded accordingly.

The supervisor should be keenly aware of the new man's attitude. He should try to sense whether or not his man feels confident, sure of his position, and optimistic toward his future in industry. This demands an acute sensitivity on the part of the supervisor regarding the feelings of others. It obviously has nothing to do with the supervisor's engineering abilities or scientific aptitude. In fact, many observers have found that the rigid training in analytical thinking—an essential part of an engineering education—tends to dull, rather than sharpen, an individual's sensitivity to people. Engineering problems usually yield black or white solutions under impersonal analysis; the answers to "people problems," though, are usually found in shades of gray. This is not meant to imply that the engineering abilities of the supervisors of young engineers are unimportant. Nothing could be further from the truth. Most new graduates have a very idealistic concept of engineering science and practice. Supervision by an incompetent engineer could prove completely disillusioning. To do a satisfactory job, therefore, a supervisor of young engineers must be a competent engineer, aware of the needs of his charges, and with enough energy and ability to meet them.

What are some of the needs and attitudes of young engineers? Graduate engineers have been trained along professional lines. As a result, they feel a personal responsibility for work assigned them. In general, they also prefer to work with less supervision than nonprofessionals. Surprisingly enough, this often results in greater conflict with engineer-supervisors than it would with lay supervisors. The engineer-supervisor, like his new charge, feels a deep sense of personal responsibility. Since his assignment consists of obtaining results, he tends to impose his ideas and methods on his people. While this may suffice in supervising nonprofessionals, it is resisted by engineers. The resistance probably varies as the length of the engineer's experience, but it is present to some degree in the new graduate.

The new engineer's desire to work with little supervision, coupled with his need for guidance in his new job, places a premium on supervisory coaching skill. While coaching receives much publicity as a vital element of supervision, very little is said about its actual practice. In too many cases, coaching consists of one of two extremes. If the supervisor wants some routine leg work done, the employee is told what to do, when to do it, how it should be accomplished, and where it should be done. In addition, the supervisor, if he is a member of the cult of human relations, may even go to great lengths to explain why this job must be done and how its accomplishment may be related to the cosmic scheme of things. Having done this,

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About the Author . . .

Mr. Redd

William M. Redd, Jr., is a training representative in the Engineering Department of E. I. du Pont de Nemours & Company, Wilmington, Deleware. Born in Baltimore, he received his B.S. degree in civil engineering from the University of Maryland in 1942 and his M.B.A. from the same school in 1949.

Prior to joining Du Pont in 1951, Mr. Redd had worked with Turner Construction Company of Philadelphia and also served as an instructor in civil engineering at the University of Maryland. His assignments have been in areas of employment, placement training and professional development of engineers. The material in this article was developed during a six-month study of the field of professional development for Du Pont's Engineering Department.

He is a member of ASEE and the American Association of University Professors.

our supervisor contratulates himself on the thoroughness of his supervision.

If, on the other hand, the supervisor wishes his man to solve a complex problem or conduct a complicated study demanding searching analysis, he is likely to issue such directions as "see what you can suggest regarding the possibility of converting our bubble gum production from a batch to a continuous process."

Obviously, effective coaching lies somewhere between these two extremes. In the first case, our new employee feels hemmed in. He has been given no voice in the selection of methods. The procedures which seem simple and straightforward to the supervisor may seem awkward and obtuse to the employee. Furthermore, he has been provided no opportunity for satisfaction either in his own eyes or those of his boss. If he is successful, it merely proves that he is capable of carrying out the instructions of his supervisor. If the attempt is unsuccessful, it proves that the new man is incapable of following the simplest instructions.

In the second case, the new man is liable to panic immediately. In school, he had no opportunity to tackle broad, open-ended problems. While he probably played a part in the conduct of some fairly extensive design and research problems, landmarks and limits were provided by the faculty. What should he do? Apparently, his supervisor feels he should be able to handle the problem from scratch or he would have provided more complete instructions. Asking the supervisor for more detailed instructions, therefore, should be avoided since it may indicate incapability. His only alternative, then, is to take off on the problem and hope for the best. Too often, the results are disastrous. The problem is unsolved; the new employee feels that he has not received a fair trial, and the supervisor feels that the new man lacks technical ability. Then comes the classic reversal: since the "light hand on the throttle" technique has failed, our supervisor switches to the opposite extreme. Each step is prescribed and meticulously dissected for our now frustrated engineer. He is allowed to do little more than grind out answers on his slide rule. With time, the problem is solved and the technical difficulties end. Unfortunately, however, the personnel problems have just begun.

Actually, effective coaching begins with the proper selection of the problem. Problems for new engineers should tax their abilities, but do not overwhelm them. They should be of such short duration that the new man sees the results of his work during his first months on the job. They should be sufficiently practical to enable the new man to realize that he is capable of making contributions in industry. In short, they should be problems which prove to the new engineer that his profession, while complex and demanding, can be satisfying.

In determining the extent of instructions, the frequency of follow-up, the degree of technical assistance, and the frequency and depth of reports required, the supervisor must be guided in large measure by his appraisal of the ability, personality, needs, desires, and maturity of the individual engineer. This involves an attempt at the practice of empathy—the imaginative projection of one's own consciousness into another being. This projection is obviously impossible to achieve, but even an imperfect attempt at observing the work situation through the eyes of the new employee proves valuable.

The supervisor must remember that the employee brings more than his technical training with him when he reports for work . . . the engineering knowledge he brings must be transmitted through the whole man.

Regular appraisal sessions give the young engineer a chance to learn his progress and ask about his goals; they help establish two-way communications.

Let's take a look at this "whole man." We know that the pattern of an individual's actions and responses is determined to a great degree by his environment and experience. To do a good job, the supervisor should know as much as possible about the man's background. Is he married? Does he have any children? Are his parents living? What was his father's occupation? Did the employee work while in school? What did he do and why? Has he been in the armed forces? If so, what did he do and what is his opinion of the military? How is his health? How intelligent is he? Do his college grades reflect his abilities? If not, why not? Has he been subjected to authoritarian or democratic leadership at home? In school? Which does he prefer? Why? Is the man's preferred type of leadership that which his supervisor practices?

It is very difficult to find the answers to all these questions without seeming to pry into the man's affairs. Furthermore, even if the answers are known, it is impossible to predict their effect on the man's performance with a real accuracy. The sum of this knowledge, however, may give the supervisor clues to the approach which will produce the most favorable response from the engineer.—**End.**

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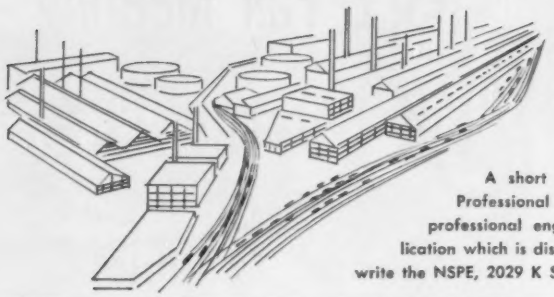

DIGEST

A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.

✓ Federally-employed engineers and scientists were granted the full ten per cent increase given other Federal classified employees, after a touch-and-go battle in which NSPE played a prominent part. In a series of personal contacts, letters, telegrams, supporting action by state societies, etc., NSPE pointed out that a denial of the increase would be a heavy blow to the morale of Federal engineers and would probably lead to greater personnel losses among the key employees. Following the favorable action, the Society declared that while it welcomed the result, the preferred method of dealing with the recruitment and retention of engineers and scientists is through a separate professional classification and compensation schedule.

The new pay rates, by grade, are in the following ranges:

GS-5	$4,040-4,940	GS-12	$8,330 - 9,530
GS-6	4,490-5,390	GS-13	9,890-11,090
GS-7	4,980-5,880	GS-14	11,355-12,555
GS-8	5,470-6,370	GS-15	12,770-13,970
GS-9	5,985-6,885	GS-16	14,190-15,150
GS-10	6,505-7,405	GS-17	15,375-16,335
GS-11	7,030-8,230	GS-18	17,500 (no steps)

* * * * *

✓ A further key feature of the new pay act provides that professionally trained college graduates may enter the Government service at GS-7, instead of the present GS-5. Initially, the implementation of this authority will be limited to "top quality" candidates under CSC regulations. In regulated legislation, the House version of the space agency bill allows 250 scientific, engineering and administrative positions up to $19,000 per year, plus ten employees up to $21,000. The Senate version allows only 200 positions up to $19,000, but would have the Civil Service Commission develop a basic pay plan for use of the agency, subject to Congressional approval. Both bodies rejected the Administration's "blank check" proposal for key personnel.

* * * * *

✓ J. D. Staley, assistant division manager of the American Management Association, recently told an ASME meeting that many young engineering graduates recruited for jobs in industry a few years ago are trooping back to their college placement offices to look for new jobs. The principal reasons, he said, are that companies are not keeping the promises made when they hired the men, and in many cases don't even have work for them. Staley cited a survey showing one-fifth of 1,300 engineers said their first job was not as the recruiters had described. Complaints referred to subprofessional and clerical tasks, failure to comply with the promise that the neophyte would work with experienced seniors, the "impersonal touch" on the job, and the feeling of no sense of identification with the company or its product. The complete paper by Staley (58-SA-45) is available from ASME, Order Dept., 29 W. 39th St., New York 18.

* * * * *

✓ A "Check List for Managers of Engineering and Scientific Organizations," has been published by the U.S. Civil Service Commission to aid managers who wish to assess, for their own guidance, the effectiveness with which they use scientific and engineering manpower. The publication contains two sets of questions—one for top management and the other for middle management. Copies can be secured from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C. at fifteen cents per copy, twenty-five per cent discount on orders of 100 or more.

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✓ "Study of the Purdue Engineering Graduate," covering 3,800 alumni from the classes of 1911 to 1956, inclusive, shows a substantial percentage increase in registration over the years. From the classes of 1911-15, fifty per cent are registered as P.E.'s or E.I.T.'s, contrasted with the class of 1956 in which sixty-six per cent are registered. The full survey, which also covers employment records, salaries, professional activities, personal information and opinions about education received, is being published by the Purdue Engineering Experiment Station.

* * * * *

✓ "Administration of Salaries for Engineers and Scientists," and "Intangible Rewards for Engineers and Scientists," are newly-announced studies by John W. Riegel, Director, Bureau of Industrial Relations, University of Michigan. Both reports are available in one volume, or separately. The one-volume report is priced at $6 and may be ordered from the Publications Distribution Service, University of Michigan, Ann Arbor, Mich. The reports are based on a two-year study of the utilization and motivation of engineers and scientists in ten companies.

* * * * *

✓ Starting salaries for current engineering graduates are running about $475 to $500 per month, compared to $380 to $400 for non-technical graduates, according to a survey of colleges and universities by the Northwestern National Life Insurance Co. Generally, starting salaries are up by from three to five per cent over last year, the report states. The University of Pennsylvania's Placement Service reports an average starting figure of $500 for engineers compared to $420 for business and liberal arts. Both surveys report over-all recruiting is down, but engineering graduates are still in a highly preferred position.

NSPE Fall Meeting Set October 23-25 In San Francisco

A classic view of San Francisco's downtown skyscrapers and a portion of the 8-mile-long San Francisco-Oakland Bay Bridge is attained from a vantage point atop famed Nob Hill.

MEMBERS of the National Society who plan to attend the forthcoming fall meeting, October 23-25, in San Francisco, California, have a wealth of sightseeing and travel enjoyment awaiting them.

The San Francisco meeting offers an excellent opportunity for vacationing either in the city itself or in any one of the hundreds of well-known recreational areas surrounding the city. As often done in the past, many NSPE members will no doubt plan their vacations to coincide with the meeting dates.

A departure from the usual procedure at this meeting will find the program getting under way with a luncheon on October 23, instead of the usual opening dinner. All sessions will be held at the St. Francis Hotel.

Above: A relic of the past is the 40-foot water wheel of the old Bale Mill, built in 1846. Below: Sunbathers relax at Warkiki Beach.

Grant Avenue in San Francisco's Chinatown.

Fisherman's Wharf is a favorite spot for all visitors to San Francisco. Here NSPE members may enjoy the colored fishing boats, the colorful displays of seafood, and the lively scenes along the wharves.

Twin 746-foot towers of the $35,000,000 Golden Gate Bridge loom majestically over the Golden Gate.

"The Rock"—grim old Alcatraz Prison is an object of never ending awe to most people. Perched on solid rock in the middle of the bay, Alcatraz is a maximum security prison where some of the nation's most case-hardened criminals are confined. The island was named by Don Manuel de Ayala when he sailed the San Carlos into the bay on August 5, 1775.

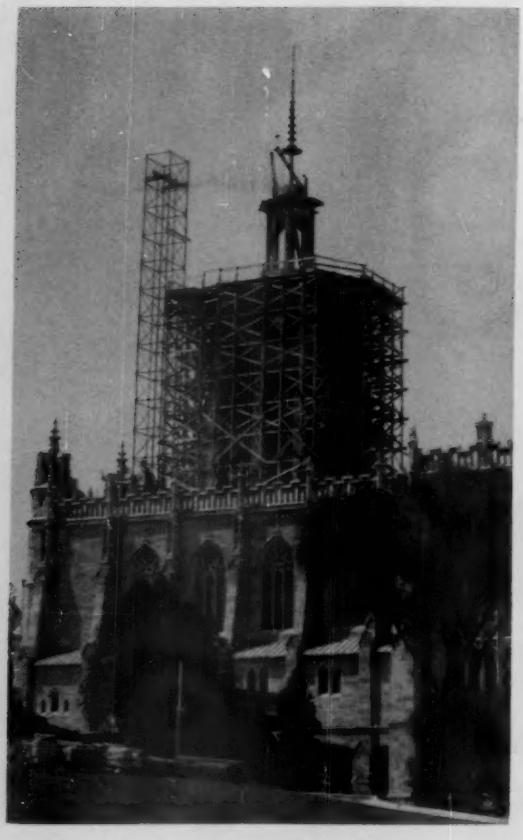
No Such Thing As a Skyhook? Here's One Above a Church!

An American Engineer Photo Story

FROM time immemorial, construction engineers have searched for the proverbial sky hook to reach into places accessible only with great difficulty. The need for a device which would not depend upon ground equipment such as cranes is particularly felt when heavy and bulky objects are to be erected at high elevations in congested, or otherwise restricted, areas.

A new era dawned in the construction industry when Acorn Iron Works of Detroit, Michigan, used a helicopter to erect a 40'3" church spire atop a 150' tower. This company initiated and designed this method of erection for the steeple of the $5,000,000 Kirk-in-the-Hills located in fashionable Bloomfield Hills, Michigan. It was successfully accomplished with a considerable saving of time and cost.

The usual method for the erection of this spire would require a heavy crane with 190' of boom. This operation was rejected because of cost, as well as the possibility of breaking the concrete surrounding the church. The main objective, however, of this departure from the conventional method of erecting structural steel was to ascertain, for the first time, that a helicopter and its pilot can become an



Above: The whirlybird moves into position while workers grasp the iron parts and place them together. Thus was erected a 40' 3" spire atop a 150' tower.

Left: Here is the Kirk-in-Hills church in Bloomfield Hills, Michigan, which has the distinction of being the first such building to have its spire put into place by a hovering helicopter.

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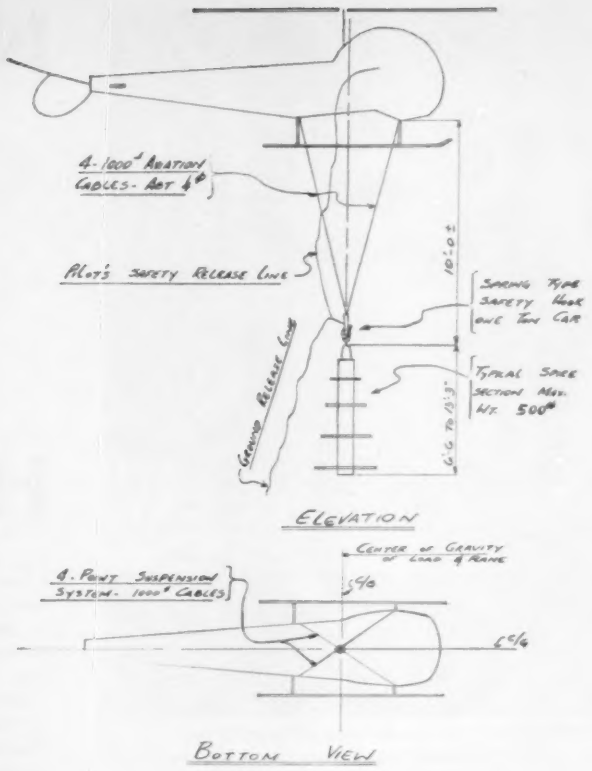
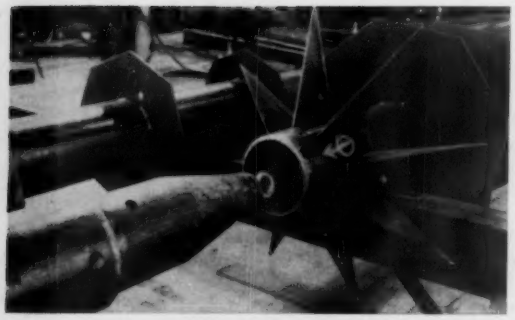
integral part of an erection crew. This was proven conclusively. The pilot had no difficulty in hovering over the structure and holding the parts to be erected in position long enough for the iron workers atop the tower to make the connection.

The only helicopter available in Detroit at that time was a Bell Aircraft 47 H with a lifting capacity of only 600 pounds. For this reason, Acorn Iron Works found it necessary to cut the tubular spire into five parts, each weighing approximately 450 pounds. The parts varied in length from 6'6" to 13'3". The field splices were designed of a tapered sleeve type. The ends of the spire parts were prepared in the shop for full butt field welds. A temporary erection bolt was provided at each splice to hold the spire together until the erection was completed. The welding was performed later.

The erection crew consisted of a foreman, two connectors, and two ground men. Subsequent to the erection of each part of the spire, the iron workers added a 5' section of



Here are the plans for lowering the spire. A spring type safety hook was used to hold the load about ten feet below the bottom of the helicopter. The load could be released by means of either of two release lines leading to the erector on the structure and to the pilot in the cockpit. The release line leading to the pilot was to be used in case of emergency only.



Above this page: The tubular spire was cut into five parts and several are shown here. The parts varied in length from 6'6" to 13'3". The field splices were designed of a tapered sleeve type. The ends of the spire parts were prepared in the shop for full butt field welds. A temporary erection bolt was provided at each splice to hold the spire together until the erection was completed. The welding came later. Another modern touch was introduced when a walkie-talkie was used to give the pilot instructions in lieu of the conventional hand signals.

Safeway scaffolding to provide a work platform. This operation consumed only about ten minutes each time.

A four-point suspension system of rigging was worked out to properly distribute the weight of the members in relation to the center of gravity of the helicopter. 1000-pound aviation cables were used. A spring type safety hook was used to hold the load about ten feet below the bottom of the helicopter. The load could be released by means of either of two release lines leading to the erector on the structure and to the pilot in the cockpit. The release line leading to the pilot was to be used in case of emergency only.

Since the Bell 47 H helicopter is not equipped with a mirror to permit the pilot to view the operation, the signals were given to the pilot by means of a walkie-talkie, in lieu of the conventional hand signals.

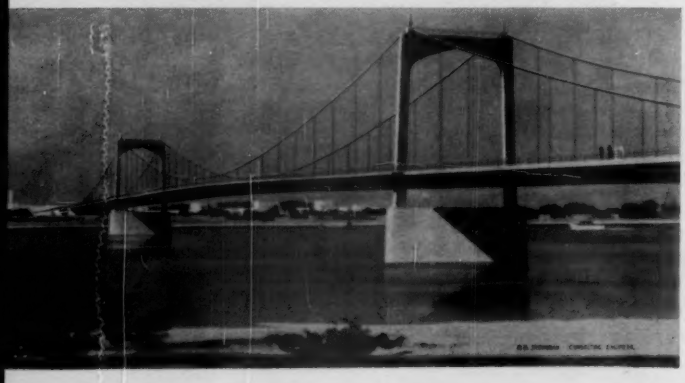
The total time charged to the erection of the spire was four hours. The rate for the helicopter was $75 per hour, airport to airport. The actual time consumed in the erection of the five parts of the spire was only one hour and thirty minutes.

Now that the way is paved, more of the potentialities of the helicopter as a sky hook for construction purposes will no doubt be explored, particularly when helicopters of greater lifting capacity become available.—**End.**

Horizons in Engineering

Dr. Steinman's most recent achievement: the mighty Mackinac Bridge in Michigan. Here were erected 552-foot towers which reach down into gorges 210 feet below the water and which stand 3,800 feet apart. And here 42,000 miles of wire were strung to form the cables from which hangs the 6,600-ton roadway.

A self-anchored suspension bridge, proposed by Dr. Steinman, for spanning the Tigris River in Baghdad, Iraq, has been selected by the Ministry of Development from comparative designs of five different types of structure submitted by Dr. Steinman in his preliminary report. The selection of the suspension design, shown below, was based on its inherent grace and beauty at a location near the King's Palace where maximum aesthetic appearance was the governing consideration.



HORIZONS are not boundaries. The future of engineering is unbounded. There is no limit to future progress and achievement.

The horizon is merely the line of tangency circumscribing that which is immediately visible. There are always much vaster areas beyond the horizon. The opportunities for future discoveries and inventions are unlimited.

The one assured fact is that horizons are ever expanding. As we scale new heights, new and greater horizons come into view.

When we stand on the seashore, our horizon is a circle of three miles radius. When we ascend to the top of the Empire State Building, our horizon is enlarged to a radius of forty-one miles. The area of our field of view is increased two-hundred-fold.

Our one lesson from past experience is never to underestimate the future of engineering progress. Each new discovery opens tremendous vistas of further invention and application. The quickening tempo is logarithmic. Each new generation, building on the past, sees more progress in science and engineering than was recorded in all the preceding centuries.

Before the dawn of history, the greatest engineering achievement was the invention and application of the wheel. This was man's first great improvement upon nature The prehistoric genius who hit upon this apparently simple invention could not have visualized the vast future significance, the amazing vistas of mechanical progress thereby made possible. Hardly any subsequent engineering advance would have been possible without the wheel in its manifold developments, symbolized by all the indispensable wheels of industry, transportation, and power. One invention led to millions of others. If all the wheels used, consciously or unconsciously, in our daily lives were suddenly annihilated, our civilization would collapse.

Despite occasional myopic prophets who discounted further progress, engineering achievement has advanced at an ever accelerating tempo.

In 1837, a distinguished British scientist, with the odd name of Dionysius Lardner, published a scientific paper in which he proved, with irrefutable mathematical equations nobody could question, that it was impossible to build a steamship capable of non-stop voyage from England to America. A few months later, on April 24, 1838, the steamer *Sirius* arrived in New York, the first to cross the Atlantic entirely under steam. The ship brought to America copies of Lardner's paper "proving" that such voyage was impossible!

In 1843, Henry L. Ellsworth, U. S. Commissioner of Patents, wrote in his annual report to Congress:

"The advancement of the arts, from year to year, taxes

By

DR. DAVID B. STEINMAN, P. E.,

Consulting Engineer and First President, National Society of Professional Engineers

The $20,000,000 Kingstom-Rhinecliff bridge. This Hudson River crossing, designed by Dr. Steinman for the New York State Bridge Authority, carried 65,146 vehicles in one month. The bridge features two continuous deck-truss units of 500-800-500 ft. spans with one such unit centered over each navigation channel.

our credulity and seems to presage the arrival of that period when human improvement must end."

If the Commissioner had been a mathematician, he would have known the elementary fact that an expanding series can never be convergent; it can never approach a limit, but must continue to expand to infinity.

In 1902, Simon Newcomb, the distinguished American mathematician, published a paper in which he proved mathematically that mechanical flight, of a machine heavier than air and capable of carrying a man, was physically impossible. The following year, on December 17, 1903, two bicycle mechanics, the Wright brothers, made their epoch-making flight at Kitty Hawk in North Carolina—the first flight by man in a machine heavier than air. That is the way progress is made—by defying the impossible!

WITH their crude box-kite, made of wire, wood and fabric, and propeller-driven by a small motorcycle engine, Orville and Wilbur Wright ushered in the age of flight, leading to the present gigantic and powerful multi-engined planes and ultrasonic jet planes, and an unlimited future of rockets, artificial satellites, and space-travel.

This picture of human progress is sketched in some lines I have written, under the caption "Ad Astra."

When man first flung a log astride a stream,
  He leapt millenniums beyond his birth;
Now strands of steel translate his lofty dream
  To link the farthest corners of the earth;
He tames the sea, and ventures forth to sail
  The very skies in globe-encircling flight;
His jets and rockets blaze a fiery trail
  And ring the universe with lanes of light.

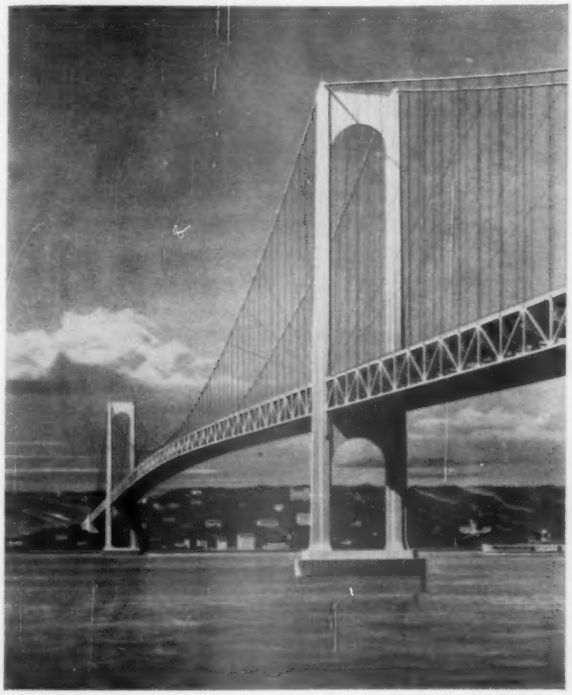
Unsated still, though master now of space,
  Man strives (as strive he must) to conquer time;
Some inner force impels him on, to trace
  Beyond the stars a destiny sublime.
With light of faith to set his spirit free
  Man builds a bridge to span eternity.

In 1912, when I was a young professor of Civil engineering at the University of Idaho and had just published a book on *Suspension Bridges and Cantilevers,* I was in correspondence with Gustav Lindenthal, who was then the dean of American bridge engineers. I confided to him my ambition to specialize in long-span bridges; he replied in a discouraging vein, declaring that no more long-span bridges would be built; the high price of steel, he said, had made them prohibitive. (The price of steel, erected, had gone up from two-and-a-half cents to three cents a pound! Two years later, in 1914, Lindenthal called me to New York to be his special assistant on the design

Final test borings and topographical surveys are now being taken, and Dr. Steinman is proceeding with the design of the Intercontinental suspension bridge across the Bosporus at Istanbul, Turkey.

The bridge, with a main span of 2215 feet and two side spans of 861 feet each, will be the longest suspension bridge outside of the United States. It will provide four 11.5 ft. traffic lanes, a 20-inch median strip, and two 5-ft. sidewalks.

Supporting the suspension bridge are two steel towers, rising to a height of 432 feet above water. They in turn will be supported on caissons sunk to rock to an estimated depth of about 168 feet below water, making the total height of the tower 600 feet above base of deepest pier.



and construction of two new record-breaking bridges, the Hell Gate Bridge at New York (the world's largest and heaviest arch span) and the Sciotoville Bridge over the Ohio River (the world's greatest and longest continuous truss bridge). Never underestimate the future of engineering!

It took forty years (from 1889 to 1929) to increase the world's record span length by only 150 feet, from the Forth Bridge in Scotland with 1700-foot span to the Detroit-Ambassador Bridge of 1850-foot span. In the next *eight* years, in two bold jumps, the world's record span-length was *more than doubled,* with the George Washington Bridge (1931) of 3500-foot span and the Golden Gate Bridge (1937) of 4200-foot span.

In the ten years from 1930 to 1940 there was more progress in bridge engineering than in all the centuries preceding. This included new bridge types, new record-breaking span-lengths, new materials, improved methods of analysis, and new erection methods. We are now working on bridge projects with unprecedented span-lengths of 5000 to 6300 feet, and bridge engineers now agree than span-lengths of 10,000 feet are well within the range of practical feasibility.

More than 7,800 tons of structural steel went into this new half-mile-long bridge which will carry Federal Aid Interstate Route No. 5 over the Illinois River at Peoria, Illinois. Fabricated and erected by Allied Structural Steel Companies, it consists of ten spans, with the center span measuring 600 feet.

ON November 7, 1940, the world was shocked and the engineering profession was startled by the aerodynamic destruction of the Tacoma Narrows Bridge, of 2800-foot span, in a mild gale. But this was only a temporary setback. I had discovered the phenomenon two years earlier, and I devoted seventeen years to the mastery of the problem, by intensive research, invention, and mathematical analysis. By combining three engineering sciences, suspension bridge analysis, mathematical theory of vibrations, and aerodynamics, a new science has been created—*Suspension Bridge Aerodynamics.* Now long-span bridges can be designed with complete assurance of perfect aerodynamic stability, and without sacrificing beauty and economy.

We are living in a wonderful age of discovery, invention, and engineering progress. In my lifetime I have seen the invention and development of the X-Ray, the phonograph, motion pictures, wireless, dirigibles, airplanes, radio, color photography, television, and thousands of other inventions scarcely conceivable by former generations. From the horse and buggy and the horseless carriage we have advanced to the automotive age with 65,000,000 motor vehicles on the highways of America. The new luxuries and conveniences, unknown to the millionaires of yesterday, have been made available to the millions today. New triumphs of engineering have made this possible—mass production, the assembly line, automatic machines, and interchangeable parts.

We now have automation, electronic computers, cybernetics, guided missiles, jet planes, and rockets, and we are going on to satellites, flying saucers, platforms in space, space ships, interstellar communication, and interstellar travel. From mastery of our planet, man goes on to the conquest of the universe.

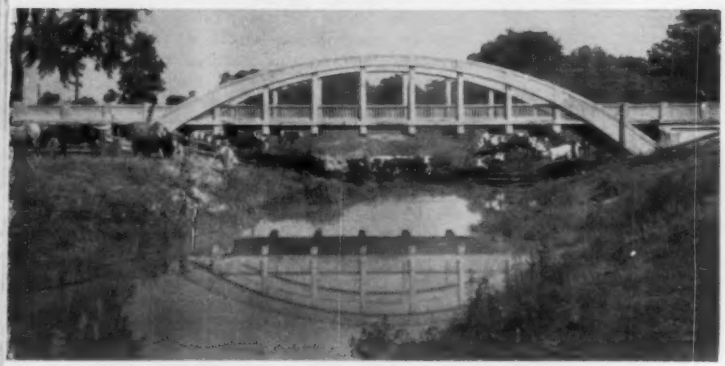
In 1917-20, when I was professor in charge of civil and mechanical engineering at the City College of New York, I established courses in aeronautics, including aerodynamics, airplane design, airplane engines, etc., with laboratories completely equipped with airplanes and airplane engines contributed by governments and private agencies. These were the first courses in aeronautics in any college in America. In 1920 the absentee president of the college returned from the Peace Conference at Versailles. He ordered the aeronautics courses discontinued and the aeronautic laboratories dismantled because, he said, the war was over and there was longer any future for aeronautics! He lacked the vision to see beyond the horizon.

Around the turn of the century, two American physicists, Michelson and Morley, made precision measurements on the velocity of light and discovered a startling paradox—the measured velocity (c) was invariant, whether measured with or against the direction of the earth's motion.

(Continued on page 41)

• A Panorama of Bridges •

Bridges represent to the average man the genius of the engineer. At right is the famous San Francisco-Oakland Bay Bridge.



This pastoral scene of the Ohio countryside is dominated by an old bridge that has managed to maintain its graceful beauty over the years.

The Bayonne Bridge over Kill Van Kull, Bayonne, New Jersey, and Port Richmond (Staten Island), New York.

The Walt Whitman Bridge, newest connecting link between the Pennsylvania and New Jersey turnpikes, utilizes approximately one million pounds of aluminum. The structure marks a new record for use of the light metal on a bridge.

...NEW LITERATURE...

To help the offering firms determine which literature you require, when requesting an item, be sure to list all specifications shown . . . and say you saw it in the AMERICAN ENGINEER.

ACETYLENE PROCESS—A six-page brochure describing the new SBA-Kellogg acetylene processes has just been published by The M. W. Kellogg Company, a subsidiary of Pullman Incorporated. The brochure describes the processes developed originally by Societe de l'Azote (SBA) of Belgium to produce high-purity acetylene from natural gas or from naphtha and other liquid feedstocks, now made available to the petroleum and petrochemical industries by collaboration between SBA and M. W. Kellogg. The new brochure describes the process in some detail. It includes a general flow sheet, discusses the two types of burners used (depending on feedstock), the recovery system, and feedstocks. Supplementary information gives a summary of direct operating costs for four cases with natural gas and naphtha as feeds, and the economics of acetylene production for the same four cases. Copies are available from The M. W. Kellogg Co., 711 Third Ave., New York 17, N. Y.

—AE—

TEST APPARATUS—A table-top, twenty-ton capacity consolidation machine called the "Levermatic" is described in a new 2-page bulletin now available from Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill. Also described in the bulletin are consolidation accessories such as fixed-type consolidometers, dial indicators, weight sets, and specimen trimming equipment. Medium capacity consolidation frames, as well as high capacity units, are also covered in the bulletin. The "Levermatic" apparatus is a new laboratory device for testing the load settlement characteristics of soils.

—AE—

QUALITY CONTROL—Engineers, buyers, designers, fabricators and others involved in the selection and application of tubing, will be interested in a 24-page booklet, "Quality Control," recently published by the Tubular Products division of The Babcock & Wilcox Company. This illustrated booket, known as Bulletin TB-420, describes the various testing and inspection methods used during the manufacture of B&W's line of seamless and welded carbon, alloy and stinless steel tubular products. The booklet explains how these inspection and testing techniques are integrated into the manufacturing process. Copies of TB-420 are available from the sales office of the company at Beaver Falls, Pa.

REPRODUCTION—A 12-page illustrated booklet describing the Copyflex diazotype reproduction process is available from the Charles Bruning Company, Inc., 1804 W. Central Rd., Mount Prospect, Ill. The booklet explains the various types of direct-positive prints possible with Copyflex—including back-line or color-line prints on white or tinted stock; multi-color films for projection and overlays; translucent duplicate originals;

dimensionally stable film and glass cloth prints; and reflex prints on translucent film. The booklet also explains how the use of Copyflex reproducible reproductions (intermediates) can save time, expense, and work in engineering, drafting, and reproduction departments. Nine models of Copyflex machines are described.

—AE—

CONDUCTORS—A major "first" in availability of engineering data for users of aluminum electrical conductors has been achieved by Aluminum Company of America. With publication of "Aluminum Electrical Conductors—General Engineering Data," conductor users for the first time may consult a complete listing of approximately 4,000 immediately available sag and tension charts encompassing virtually every type of covered and bare aluminum conductor. This list represents by far the most comprehensive series of charts available in the industry. As part of the index, Alcoa has included a handy desk-top glossary of aluminum conductors, listed alphabetically by code name. The listing is planned as a major tool for use by purchasing, stores and engineering departments of conductor users. Maximum convenience to the user was considered in preparation of the new publication. Punched for desk-top maintenance in a loose-leaf binder, the index is file size. The 88-page booklet is being made available directly to all Alcoa's electrical conductor customers. Copies may be secured by conductor users upon request to any Alcoa sales office.

MOVABLE WALLS—A fully-illustrated 12-page brochure, now available from the E. F. Hauserman Company presents key features, complete architectural specifications, and detailed sectional drawings of the company's new Type HP movable wall system. Combining low initial cost with many of the design refinements of premium-priced walls, the new wall system features full-flush panels with single-line joints; fireproof and sound-resistant construction; wide color choice; complete reusability of all components when layouts are changed; and installation by Hauserman's skilled erectors. These and other salient factors are discussed in the brochure. Some of the design variations possible with the new system are clearly diagrammed; photographs of panels, posts, ceiling trim, door frames and other components complete the description. The brochure may be obtained from the E. F. Hauserman Co., 7516 Grant Ave., Cleveland 5, Ohio.

—AE—

SPACE—Applied research in space technology, plasma dynamics, and hypersonics is described in a new booklet published by the General Electric Company. Each of the five principal operations in the G-E Missile and Ordnance Systems Department's Aerosciences Laboratory at Philadelphia is summarized in the 16-page booklet. Included are detailed drawings of a new six-inch diameter, 134-foot-long shock tunnel and picture caption summaries of research activity in gas arcs, recombination rates, plasma acceleration, material emissivities, high temperature radiation, and gas-phase chemical reaction. The booklet is available by writing: Missile and Ordnance Systems Department, Room 5A, General Electric Co., 3198 Chestnut St., Philadelphia 4, Pa.

—AE—

DRAINAGE—Manufacturers of corrugated steel riveted culvert pipe, as well as designers, engineers and others who must plan and execute installations where drainage and loading problems are encountered, will be interested in and find useful the second edition of Bethlehem Steel Company's booklet, "Solving Drainage Problems." To be had by writing to Bethlehem's Publications Dept., Bethlehem, Pa., this 76-page illustrated brochure contains, in addition to a wealth of descriptive information, charts and data, new tables for the evaluation of flow friction that will greatly simplify planning and design under most conceivable conditions.

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims.

N.S.P.E. Believes

Student Chapters

By Paul H. Robbins, P. E.

Executive Director

N. S. P. E.

As the engineering profession has progressed through the last few years, and correspondingly has recognized its responsibilities in the professional sense, more and more young people are becoming interested in the many facets of the profession of engineering as apart from its technical development. A number of committees of NSPE, as well as its state societies and local chapters, have been working with these young people to acquaint them with the many ramifications of such subjects as ethics, registration, unions, employment practices, public relations, professional leadership, and other items which lead to the development of the well-rounded professional man.

Many times these young people have expressed the opinion that an opportunity to discuss these items while on the college campus would have been most welcome. Several of NSPE's state societies, through the faculty and interested members of the profession, have established such discussion groups; and in many instances they have evolved into student chapters of the state society of professional engineers. The students who comprise these student chapters have requested national recognition, and last year the Board directed a committee to be appointed to study what service the National Society might render to such student groups. In a very complete report to the Board at the St. Louis meeting, the committee recommended and the Board approved recognition of these state society affiliated student groups as a part of the over-all national professional society. A criteria was established for the recognition of such student chapters, and a series of items will be supplied each student to assist him in his professional development. This will include seven issues of the AMERICAN ENGINEER during his school year, a copy of the Engineer's Creed, a pin and card to identify him with the professional group, and it is hoped in time, a series of suggested professional discussions which the chapter may have during the school year.

Before presenting this program to the Board, the Student Chapter Committee made a survey of the affiliated state societies of NSPE and found that there now exists some nineteen student chapters with a total membership of 1,558 students, functioning in eleven states. Several additional states reported that there was considerable interest among the students in several universities in their state for the development of student chapters.

One of the aspects emphasized in the Committee's report was the need of assistance by experienced engineers to student chapter activity. Many of the discussions of professional matters are considerably enhanced by the experience of older engineers. In addition, they can bring to the students the benefit of extensive discussions that have occurred in Society circles as well as professional meetings. They can also bring first-hand information concerning the practical applications of some of the professional concepts of our profession. Student chapters deserve and need the guidance and assistance of the state society and its nearest local chapter.

NSPE believes student chapters of the professional society can be of assistance in developing a professional consciousness among the future members of the engineering profession, as well as providing a forum where young men can discuss many of the professional problems they will face when they leave the university classroom for the everyday business world. For sometime now NSPE has been supplying items of information from its studies and reports to university libraries, but NSPE believes that the creation of student chapters will provide a means whereby this information can be more readily available to students. By being concerned with these problems at the time they are acquiring their professional proficiency they will carry forward into their careers as professional engineers, a consciousness of professionalism they might not otherwise obtain.—**End.**

With Our Members . . .

Washington County

Pennsylvania Chapter Presents Award to Newspaper Editor

An award was presented to Guy R. Day, managing editor of *The Washington (Pa.) Reporter*, at the final dinner meeting of the Washington County Chapter, Pennsylvania SPE, held in June at the George Washington Hotel.

The award plaque, arranged as a surprise to the recipient, was tendered Mr. Day in recognition of his efforts in behalf of the chapter's campaign to effect laws that will eliminate improper heating installations and thereby reduce carbon monoxide deaths.

The presentation was made by Edward L. Dryer, of Lancaster, Pa., president of the Pennsylvania SPE.

In a short talk following the award presentation Mr. Dryer praised the achievements of both the Washington County Chapter and its Auxiliary during the past year.

Sanford E. DeBerry, membership chairman, and the Chapter's first president, received a plaque for his efforts in enrolling new members, which earned for the Chapter both the State and regional Ritchie Lawrie awards at the 1958 PSPE Convention.

Raymond W. Godfrey, retiring president, was presented an engraved tie clasp in recognition of his leadership during the year 1957-58.

Wives of the engineers were guests at the dinner session, the program for which included a talk by Mr. Day and concluded with a dance.

"Mortgage Burning" Ceremony Held in Ohio

The Ohio SPE recently held a "mortgage burning" ceremony following the close of a 20-month campaign to raise funds for their permanent headquarters site.

The drive was initiated in October of 1956 when the Ohio Society exercised an option on a five and one-half acre plot in Worthington, just north of Columbus. Several hundred dollars in excess of the $30,000 goal was collected during the campaign, which was called "Operation Land Grant."

Individual OSPE members contributed $19,000 in sums ranging from $1 to $250. The balance was donated by chapters, firms, and industries, including a total of $2,600 from nonmembers.

Dayton Society Meets With County Officials

To enable engineers to become better acquainted with problems facing people in public office, officers and directors of the Dayton (Ohio) Society of Professional Engineers met in June with officials of Montgomery County of various municipalities in that area.

The meeting was arranged to arouse more interest by engineers in administrative problems of the local government.

Present Plaque in Pennsylvania

The Washington County Chapter, Pennsylvania SPE, recently presented a plaque to Guy R. Day, managing editor of *The Washington Reporter*. Shown in the photo are, l. to r.: Roberts Bouson, incoming chapter president; Mr. Day; Edward L. Dryer, PSPE president, who made the presentation; Raymond W. Godfrey, outgoing Chapter president, and Sanford E. DeBerry, honored for his membership activity.

Ohio SPE Burns Mortgage

Burning the mortgage at a meeting of the Ohio Society are, l. to r.: National Director Paul A. Harlamert (catching ashes in a tray); H. Bruce Baty, OSPE president, and John D. Coleman.

WITH THE *Auxiliaries*

By Mrs. Garvin H. Dyer, Chairman of the Ladies Auxiliary Advisory Committee.

The annual Ladies Auxiliary Advisory Committee meeting was held in St. Louis, Mo., at the Chase Hotel during the annual meeting of NSPE. In the absence of Mrs. Harry G. Kennedy, chairman, the meeting was ably presided over by Mrs. A. C. Kirkwood, of Kansas City, Mo. Reports of progress and activities of the six areas were presented.

Mrs. Marcus R. Durlach presented the Southeastern report in the absence of the area chairman, Mrs. R. King Rouse. Mrs. John Pratt presented Mrs. Cedric Willson's report from the Southwestern Area, and Mrs. Dwight Busby presented Mrs. Thomas Conley's report for the Western Area. Mrs. Hugh M. Nelson's report from the Northeastern Area was received too late to be read but will be included in the annual report.

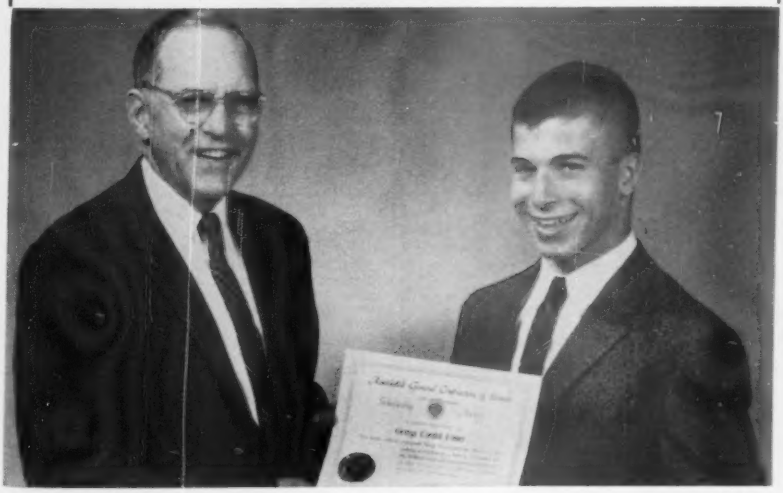
Mrs. Ronald Gordon of the Central Area and Mrs. Garvin H. Dyer of the North Central Area gave their reports in person.

Complete minutes of the meeting and also area reports will appear in the next issue of *Engineers Wives*.

Ronald Gordon, chairman of the NSPE Chapter Activities Committee, gave a short talk on various aims of the Auxiliary Advisory Committee.

The following officers were elected for the 1958-59 year: Chairman—Mrs. Garvin H. Dyer, 10011 East 36th St., Independence, Mo.; Area Chairmen—Northeastern, Mrs. Hugh M. Nelson, 327 Nevada Drive, Erie, Pa.; Southeastern, Mrs. Marcus R. Durlach, 6025 Lakeshore Drive, Columbia, S. C.; Central, Mrs. Paul Harlamert, 24321 E. Oakland Drive, Bay Village, Ohio.; North Central, Mrs. Arlow V. Ferry, 6329 Walrond, Kansas City 30, Mo.; Southwestern, Mrs. George R. Hawthorne, P. O. Box 55, Los Alamos, N. M., and Western, Mrs. Dwight Busby, 1826 E. Fairmont Ave., Phoenix, Ariz.

Scholarship Awarded



Two $4,000 Highway Engineering Scholarships are made available to male seniors from accredited Illinois high schools qualified to enter the University of Illinois—one by the membership of the Associated General Contractors of Illinois and the other jointly by two individual contracting member firms of the Association, S. J. Groves & Sons Co. and McDougal-Hartman Co. The No. 1 scholarship is shown being presented to George Fisher, right, by D. S. Magowan, district engineer of the Illinois Division of Highways. Mr. Magowan is vice president of the Illinois SPE.

East Texas Chapter Meets

Shown at a recent meeting of the East Texas Chapter of the Texas SPE are, l. to r.: R. E. Fix, program chairman; R. E. Layton, Jr., chapter president; Joe Dannenbaum, guest speaker; E. F. Neuman, propellant plant manager of Thiokol Chemical Corporation, which the engineers toured; Capt. W. T. Hannan, executive officer at Longhorn Ordnance, and H. C. Havron, chief of the quality control division at Thiokol.

Officers Visit West Virginia Chapter

The New Martinsville Chapter of the West Virginia SPE recently held a special meeting in honor of a visit from State officers William D. Nickles, president, and John R. Martin, first vice president. The former was guest speaker for the meeting.

Howard F. Wyatt, chairman of the Membership Committee, presented a report to the group. Richard L. Poling, Engineers' Week chairman, presented the State chairman, James R. Meredith, with a booklet detailing the chapter's activities during the 1958 Week.

George L. Cobb, chapter president, was presented with an official charter by Mr. Nickles.

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Advertisers' Index

Adache Associates, Inc.	38	Gilbert Associates	39	Parsons, Brinckerhoff, Hall & MacDonald	37
Edw. J. Adamec	37	Giles Drilling Corporation	40	V. C. Patterson & Associates	39
Albright & Friel, Inc.	38	Gustave M. Goldsmith	38	Pennsylvania Drilling Co.	40
Alexander Hamilton	5	Green Engineering Co.	39	Harry I. Phemister	39
Ammann & Whitney	37	Greenwich Book Publishers	8	Photronix, Inc.	40
Andrews and Clark	37	Hall Laboratories, Inc.	39	Pittsburgh Testing Laboratory	39
Michael Baker, Jr., Inc	38	Hardesty & Hanover	37	Plumb, Tuckett & Pikarsky	36
Harry Balke Engineers	38	Frank E. Harley & Associates	37	Praeger-Kavanagh	38
Elmer S. Barrett Associates	38	Frederic R. Harris, Inc.	37	Pressure Concrete Co.	40
E. D. Barstow & Associates	38	Harris, Henry & Potter, Inc.	39	Prestressing Research & Development, Inc.	39
Bedell and Nelson	36	Philip J. Healey, Inc.	40	Revolvator Co.	7
Black & Veatch	37	The Hinchman Corporation	37	Cyrus Wm. Rice & Co., Inc.	39
Borden Metal Products Co.	10	Howard Needles, Tammen & Bergendoff	37	Robert and Company Associates	36
Brockway, Weber & Brockway, Inc.	36	I&C Engineering Corp.	39	Robert Edw. Robinson Associates	36
Buchart Engineering Corp.	38	Industrial Ovens, Inc.	38	Ross-Martin Co.	4
Bucknell Engineering Co.	38	Jones, Henry & Williams	38	Russell and Axon	37
Builders Estimating Service, Inc.	40	Kaiser Engineers	36	Sargent & Lundy	36
Burns & McDonnell	37	A. C. Kirkwood & Associates	37	Seelye Stevenson Value & Knecht	38
Burns & Roe, Inc.	37	Elmer A. Kish	38	Singstad & Baillie	38
Capitol Engineering Corporation	39	Kuljian Corporation	39	Soil Testing Services, Inc.	36
Homer L. Chastain & Associates	36	D. C. Latella & Associates	39	South Florida Test Service	36
Chas. W. Cole & Son	36	Law Engineering Testing Co.	36	Sprague & Henwood, Inc.	40
Commonwealth Associates, Inc.	37	Lawrie & Green & Associates	39	Stanley Engineering Company	36
Consoer, Townsend and Associates	36	Lockwood, Andrews & Newnam	39	D. B. Steinman	38
Crescent Engineering Co., Inc.	36	Eli M. Lurie	36	Sverdrup & Parcel, Inc.	37
De Leuw Cather & Company	36	Madigan-Hyland	37	Syska & Hennessy, Inc.	38
Thomas E. Duce Associates	39	George Stanley Marshall Associates	37	Tippetts-Abbett-McCarthy-Stratton	38
Electrical Contractors Assoc., Inc.	39	Merritt & Welker	36	Toledo Testing Laboratory	38
Ellmann Engineering Co., Inc.	40	Metcalf & Eddy	37	United Steel Fabricators, Inc.	7
Engineers Testing Laboratory, Inc.	39	Miner and Miner	36	Emerson Venable	39
Eustis Engineering Company	36	Modjeski and Masters	39	Vogt, Ivers, Seaman & Associates	38
Fay, Spofford & Thorndike	37	Moran, Proctor, Mueser & Rutledge	37	Warren George	37
Ferguson-Gates Engineering Co.	39	John J. Mozzochi & Assoc.	36	Water Service Laboratories, Inc.	38
Forrest and Cotton	39	The C. W. Nofsinger Co.	37	Whitman, Requardt and Associates	36
Foster & Cafarelli	37	James P. O'Donnell	37	Wight & Co.	36
Frazier-Simplex, Inc.	39	Oklahoma Testing Laboratories	38	Wilson & Company	36
Freese & Nichols	39	John Ostborg	38		
Gannett, Fleming, Corddry & Carpenter, Inc.	39	Palmer & Baker Engineers, Inc.	36		

STEINMAN

(Continued from page 30)

This contradicted prior theories of relative velocities based on Newtonian Mechanics. Intrigued by this problem, a young Swiss watchmaker, Albert Einstein, set out to resolve or harmonize the new paradox. In 1905 he published his revolutionary *Special Theory of Relativity*, with new equations of space, time, and mass. One of these new equations he derived, the simple formula $E=Mc^2$, was to make history and change the world. For the first time, the inter-convertibility of mass and energy was indicated and mathematically predicted.

Outside the innermost scientific circles, the world paid little heed to the startling mathematical conclusions of Einstein. He worked eleven years more on his analysis, to include curvature, acceleration, and gravity, and in 1916 he published his *Generalized Theory of Relativity*. More startling conclusions, including the prediction of the curvature of light rays by gravity! In 1919, a British eclipse-expedition, in Africa, found that light-rays passing near the sun were actually curved as predicted by Einstein. His theory ceased to be a mathematical speculation; his equations became accepted working tools of science. Newtonian theories were superseded.

On August 6, 1945, the report of an atomic blast over Hiroshima was flashed around the globe. When Einstein set forth his famous conversion formula, he dared to turn his back on three centuries of scientific thinking. Because a small group of men accepted Einstein's conclusions and were willing to proceed on the assumption that $E=Mc^2$, a city was destroyed, and the history of the world has been changed. Now we know that matter and energy are convertible, and we have entered into a new era of science and invention—and constructive progress—the Atomic Age!

History has repeatedly witnessed the conversion of military devices to vastly greater and more lasting peace-time applications for the benefit of mankind. Bridges were originally built for military use; now such application has become relatively insignificant. Even explosives have found preponderant peace-time application. Airplanes, first developed for war, have become an every-day peace-time necessity. And now atomic power is speedily becoming a peace-time reality of inestimable significance. Already a valuable tool in research and medicine, the atom is going to provide all of our heat, light and power in our new dawning age of engineering progress.

THE threat of war may be a stimulus to the development of new discoveries and inventions, but the needs of peace rapidly appropriate the same inventions to greater and more enduring applications.

Men may kill and destroy for a time, but they can build forever.

It does not require too much imagination to visualize the future application of guided rockets for transcontinental or intercontinental delivery of mail and parcels; and when engineers and scientists solve the human problems involved, guided rockets will ultimately be transporting passengers in intercontinental, and even in interplanetary, travel.

Complete operation of large factories by automation is in the foreseeable future. All of this will never in itself be a cause of unemployment, for our progress will always be providing more and interesting things to challenge the ingenuity, capability and interest of our people.

The advent of the automobile put out of work a few hundred makers of buggy whips, a few thousand blacksmiths, and more thousands of harness makers and wagon builders. But it created employment for millions in the automobile industry, in accessories, in service stations, in highway construction, and other related occupations, including some ten million drivers of motor trucks, our largest single occupation, in addition to the millions of bus drivers, taxicab drivers, and chauffeurs.

Each new invention of widespread adoption, for travel, pleasure, or entertainment, creates new jobs for many thousands or millions. Our generation has witnessed the vast new industries and occupational interests created by the automobile, the airplane, the motion pictures, the radio, and television. There will be no lack of job opportunities as long as there are human needs, interests, and desires to be satisfied. And the same human needs will create the incentive for further progress and invention.

These facts have been overlooked by the pessimistic philosophers and economists of former times. As long as human nature creates needs, human ingenuity will supply the solution; and with each satisfaction, new needs and desires are created.

Through the interest of Congressman Louis C. Rabaut from Michigan, the address given by Dr. David B. Steinman, the engineer, at the Mackinac Bridge dedication was printed by unanimous consent in the *Congressional Record* of June 30. In his speech before the House of Representatives, Congressman Rabaut said:

"Mr. Speaker, how a man can make his work a prayer was brought forcibly to me when I attended the dedication services of the Mackinac Bridge on Saturday, June 28, 1958. I listened with awe to the stirring poetical address of Dr. D. B. Steinman, consulting engineer for the bridge. With pride, I place his words in the *Record*."

The progressive substitution of airplanes and helicopters for automobiles is leading to the day when each individual will be able to propel himself through the air. When this comes to pass, the critical traffic congestion which challenges our best highway planning today will eventually seem like a minor problem.

One of the most important engineering tasks ahead is to establish weather and climate control so we can protect our crops from drouth and frost, and prevent floods, and to insure adequate food supplies for all the world at all times.

We will soon be drawing power, food, drinking water and chemicals from the sea. As long as human ingenuity and engineering resourcefulness exist, we need never fear depletion of our present natural resources as a threat to survival. The resources of God's universe and the resources of the human mind are unlimited. All we need is the vision to see beyond the horizon.

Mankind is ever moving onward, and each gain in science or technology increases the certainty of further advance.

The future of engineering is to be gauged not by the past but by the problems still unsolved and the possibilities yet to be conceived and explored.

Science and engineering have liberated man from drudg-

ery and serfdom, and have given us new resources of light, energy, and power—for creative work, for culture, and for re-creative leisure. A golden era of progress such as civilization has never before known has now been made possible. The further untold possibilities of the future are beyond our ken.

The conquest of each horizon opens the vista to greater and vaster horizons to be conquered. That is the unending challenge to the scientist and the engineer.

The role of the engineer in the onward march of progress and civilization is pictured in the following lines which I have captioned "The Challenge":

Nature said: "You cannot."
Man replied: "I can."
From shore to shore, above the tides,
He built a gleaming span.

Nature said: "You dare not."
Man replied: "I dare."
He launched his winged ship aloft
And boldly sailed the air.

Nature said: "You shall not."
Man replied: "I will."
He caged the thunderbolts of Jove
And made them serve his skill.

Nature said: "You must not."
Man replied: "I must."
He split the atom. Now he holds
A godlike power in trust.

—End.

About the Author . . .

Dr. Steinman

Internationally eminent builder of bridges, scholar, teacher, author, poet—these words best describe Dr. David B. Steinman, the first president of the National Society of Professional Engineers. Graduated *summa cum laude* from the City College of New York in 1906, Dr. Steinman won scholarships for his Masters and Doctorate degrees at Columbia University.

Dr. Steinman holds more than twenty honorary and academic degrees from both U.S. and foreign universities in such diverse fields as engineering, science, literature, humanities, philosophy, and law. The 71-year-old bridgebuilder has been awarded hundreds of top engineering and professional honors and decorations from foreign governments. Designer of the recently-opened Mackinac Bridge, Dr. Steinman's current efforts are being directed toward the completion of the Messina Straits Bridge, intended to join Italy with Sicily. In addition, he is consulting engineer for other large suspension bridges, including one in Turkey and one in Baghdad.

DOUGHERTY

(Continued from page 15)

impressed themselves so deeply upon the popular mind that, if offered the choice between liberty and security, most people would almost unhesitatingly vote for security.

Science, Liberty and Peace, A. Huxley.

On Liberty . . .

A bitter quarrel arose between the horse and the stag. . . . The horse came to the hunter to ask him to take his side in the feud.

The hunter agreed, but added: If I am to help you I must put bits in your mouth and a saddle on your back.

The horse agreed. The man sprang to the saddle, and together they soon put the stag to flight. The horse then said: Now if you will get off my back and remove the bit from my mouth, I won't require your help any longer.

Not so fast, friend horse, replied the hunter. I have you under bit and saddle, and from now on you shall remain the slave of man.

Then AESOP adds: Liberty is too high a price to pay for security.

Liberty is too high a price to pay for anything else. If we are looking for security, we are a part of the problem rather than a part of the solution to the problem.

Finally, we are enticed toward group activity rather than to individual action. Some of us are willing to trade a name for a number and then place our welfare in the hands of the leader of the group. Average men have been given great power and they claim major accomplishments because of that power. Too often, their harvests are due to individual action of the engineers and scientists rather than to the group organization. New methods, new devices, new processes and new products are the extended horizons of the engineer. These make profits for industry and new rates of pay for the workers; they come because he is not afraid to be an individual; he does not fear technology, and he does not seek feline security. He is a part of the solution to the problem and not a part of the problem.

This Society has taken no mean part in the solution of these problems. It has preached the professional attitude from the house-top; it has spoken its mind about the unions; it has advocated high levels of engineering practice. Not only has it spoken, but it has dedicated its efforts to these things. It has been in the forefront of legal status for the engineer, both as a private practitioner and as an employee in industry and government.

This is no time to level off by being afraid of technology, or for seeking the shady nooks of security, or joining pressure groups to get our share of our contribution to production. Rather it is time for more originality, more independent action and more vision for the future. It is true that many frontiers will be achieved by research teams, but the teams will be composed of independent individuals. The new processes, the new devices and new methods may be far more important to labor than to management. If there are no profits there will be no wages or dividends. It is essential that new horizons be discovered and that the whole population move into new lands and new areas of activity.—End.

1959 Engineers' Week Observance Feb. 22-28, John L. Bahr Announces

The 1959 National Engineers' Week will be observed February 22-28, John L. Bahr, national chairman of the program, has announced.

The nation-wide program will be the ninth under the general sponsorship of NSPE. Promotional kits prepared by the National Society will be sent to all NSPE affiliates early in October. As in previous years, the kits will contain basic promotional suggestions concerning newspaper publicity, radio and TV coverage, exhibits, speeches, and other special projects.

Promotional aids such as one-minute TV films, radio tape recordings, posters, banners, logotypes, newspaper articles, lapel buttons, and gummed seals will be available from the National Society headquarters office. A series of "action letters" on the Week will be sent during August to all local chapters and state societies. This series will carry information on the events planned for the Week, and will describe promotional materials offered by the National Society.

The theme for the 1959 Week is "Engineering... for the Age of Space." This theme was selected to emphasize the role played by science and engineering in bringing about the new era which America and other nations are now entering—the era of the exploration of the space outside the atmosphere of our planet.

The theme will be illustrated in the poster design for the 1959 Week, and will be the basis for newspaper articles and radio and TV announcements. The theme will also be used in career conferences for high school juniors and seniors, exhibits on engineering achievements, and many other activities calling attention to the importance of a sound educational background in mathematics and the physical sciences.

The 20-minute color film *American Engineer* will once again be available for showing during Engineers' Week. Produced for Chevrolet by The Jam Handy Organization, the film is a tribute to engineers in all fields. Prints of the film may be reserved from the producers for showing during National Engineers' Week.

National Chairman Bahr has urged that all local chairmen for the Week hold organizational meetings early in the fall. "Advance planning and early committee organization is the foundation stone for a successful Engineers' Week program in February," Mr. Bahr stated.

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SUBJECT LISTING OF NSPE PUBLICATIONS

(Unless otherwise indicated publications listed below are FREE and may be obtained by writing to NSPE, 2029 K Street, N.W., Washington 6, D. C.)

CHAPTER ACTIVITIES

Monographs outlining various chapter functions have been prepared for the use of chapters: **Helping the Young Engineer, Ladies Auxiliaries, Promote Ethical Practice, Chapter Publications, Functional Group Activities, Meetings, Fellowship, Attendance, Public Relations, Education—Key to the Future, Chapter Evaluation and Scoring System, and Indoctrination Conference for Chapter Officers and Committees.**

Welcome Mr. President—An informative booklet outlining organizational functions and suggestions for chapter presidents.

COMMUNICATIONS

***How to Improve Engineering-Management Communications**—Executive Research Survey Number One. Based on a survey of more than 300 companies employing engineers, this report contains information on engineering-management relations with respect to the lines of communication between engineers and management. Price $1.00 Members. $2.00 Non-members.

COMPETITIVE BIDDING

About Competitive Bidding—Reprint from American Engineer (NSPE Believes).

Competitive Bidding for Professional Services—NSPE Professional Policy Statement.

Recommended Procedure for Negotiating Engineering Contracts—NSPE Professional Policy Statement.

CONSULTING ENGINEERS

So You Want to Open a Consulting Office—Series of articles dealing with problems faced in opening a consulting office: **By Way of Qualifications**—John B. McGaughy, P. E., **Operating Your Practice**—Alfred J. Ryan, P. E., **Ethical Problems**—Francis S. Friel, P. E., Reprints from American Engineer. 20¢ each article—3 for 50¢.

CORPORATE ENGINEERING PRACTICE

Corporate Professional Practice vs. Individual Professional Practice—The Special Committee on Registration Law, NYSSPE. Reprint from American Engineer.

Should Corporations Practice Engineering?—Ronald B. Smith, P. E. and V. George Terenzio, P. E. Reprint from American Engineer. A discussion of the pros and cons of the issues involved in the debate over corporate practice of engineering.

CREED

Engineers' Creed—Suitable for distribution—free; for framing—50¢ each.

EMPLOYMENT PRACTICES

Criteria for Professional Employment of Engineers—Adopted by NSPE, June, 1956. 25¢ each.

Engineering Employment Practices Newsletter—Published monthly by NSPE; available to members upon request.

Survey Report—Engineers Employed by Private Practitioners—Covers salaries, hours, fringe benefits, etc., of engineers employed by consultants. Price 50¢ Members. $1.00 Non-members.

ETHICS

Canons of Ethics—Suitable for distribution—free; for framing—50¢ each.

Ethics for Engineers—Canons of Ethics, Creed, and Rules of Professional Conduct.

FEE SCHEDULES

Recommended Grades, Duties, Responsibilities and Qualifications for Pre-Professional and Professional Positions—Adopted by NSPE, June, 1952.

Report on Fee Schedules—Revised October, 1956. A study of the Salary and Fee Schedule Committee of NSPE bringing together various schedules of fees and related practices of engineers in the consulting field.

FUTURE OF ENGINEERS

Engineers for the Future—Reprint from American Engineer (NSPE Believes).

If I Were a Young Engineer Today—Reprint from American Engineer.

GOVERNMENT

Engineers in Federal Government—Reprint from American Engineer (NSPE Believes).

Our Function in Governmental Liaison—Reprint from American Engineer (NSPE Believes).

INDUSTRIAL RELATIONS

A Professional Look at the Engineer in Industry—NSPE Engineer-in-Industry Committee. A major publication of vital importance delving into all phases of the professional and economic status of that group which comprises the largest number of engineers in any functional field. Price $1.50 Members. $3.00 Non-members.

Professionalism or Unionism—Facing the Issue—Past President T. Carr Forrest, Jr., P. E. A discourse on the aspects of unionism for the professional. Reprint from American Engineer.

The Professional Engineer in Industry—Reprint from American Engineer (NSPE Believes).

The Professional Union—A Contradiction—Past President Clarence T. Shoch, P. E. A discussion of the development of engineers' unions and the reasons why unionism is incompatible with professionalism.

Criteria for Professional Employment of Engineers—Adopted by NSPE, June, 1956. 25¢ each.

Engineering Employment Practices Newsletter—Published monthly by NSPE; available to members upon request.

Engineering Team (The)—Reprint from American Engineer (NSPE Believes).

Professional Responsibility vs. Collective Bargaining—NSPE Professional Policy Statement.

***Career Satisfaction of Professional Engineers in Industry**—Latest in a series of Executive Research Reports on employment and professional problems concerning engineers in industry. Price $1.50 Members. $3.00 Non-members.

LEGISLATION

Legislative Bulletin—Published monthly by NSPE; available to members upon request.

MANPOWER

***How to Attract and Hold Engineering Talent**—Executive Research Survey Number Three. This report reflects the experience of more than 200 companies which employ engineers and attitudes of 1,400 individual engineers who are employed in industry. Price $1.00 Members. $2.00 Non-members.

***How to Improve the Utilization of Engineering Manpower**—Executive Research Survey Number Two. This report pools the experience of more than 495 companies employing engineers on the subject of utilization of manpower. Price $1.00 Members. $2.00 Non-members.

MEMBERSHIP PROMOTION

Every Man a Debtor—Sixteen-page booklet explaining NSPE organization, programs, activities and objectives.

Membership Kit—This kit is available to membership chairmen and contains a general outline of membership campaign techniques and sample materials. Any of the publications listed in this outline are generally available for distribution to membership promoters as membership mailing pieces.

NSPE PHILOSOPHY

Engineering Societies of America—Paul H. Robbins, P. E., executive director, NSPE. Describes organization, programs, activities and objectives of NSPE. Reprinted from G-E Review.

Is Our Registration Requirement Limiting Membership?—Reprint from American Engineer (NSPE Believes).

Why a Professional Society?—Reprint from American Engineer (NSPE Believes).

NATIONAL SECURITY

Engineering Profession in National Security (The)—NSPE Professional Policy Statement.

ORGANIZATION

Model Constitution for Ladies Auxiliary Chapters.

Model State Society Constitution.

NSPE's Constitution and Bylaws.

POLICIES, NSPE

Professional Policies—Compilation of all present NSPE policies as adopted by the Board of Directors.

Administrative Policies—Compilation of all present NSPE administrative policies. Includes Constitution and Bylaws, with a common subject index.

PROFESSIONAL DEVELOPMENT

Professional Development—The Responsibility of Industry and the Engineer—Conference Proceedings of 1955 meeting devoted to a discussion of the engineer in industry. Price $1.00 Members. $2.00 Non-members.

Professionalism in Industry: The Dow Story—Case history of professionalism in industry. Reprint from American Engineer.

PROFESSIONAL DEVELOPMENT

Conference Proceedings, Atlantic City, 1956—Management-Professional Employee Relations, Professional Status of Engineers in Government Employment, Teaching Professional Concepts in our Engineering Schools, 10¢ each.

Du Pont's Engineering Department Takes a Forward Look at Professional Development—C. H. Evans, P. E. Reprint from American Engineer.

PROFESSIONALISM

How a Professional Attitude Can Be Instilled in Engineers—Dean W. R. Woolrich, P. E. Reprint from American Engineer.

Some Thoughts on Engineers and the Engineering Profession—Speech by Harry A. Winnie, P. E., vice president, General Electric Co. (Retired), presented at the 20th Annual Meeting of NSPE.

Significance of the PE Emblem.

PUBLIC RELATIONS

Engineers' Week—Reprint from American Engineer (NSPE Believes).

Our Public Relations Responsibilities—Reprint from American Engineer (NSPE Believes).

There's Nothing Wrong With Engineers—Reprint from American Engineer.

REGISTRATION

A Model Law for the Registration of Professional Engineers and Land Surveyors.

Is Our Registration Requirement Limiting Membership?—Reprint from American Engineer (NSPE Believes).

Next Step Registration—Informative pamphlet for engineering students and others on values and procedure for engineering registration.

Registration: Then, Now and Tomorrow—Frank H. Prouty, P. E., chairman, National Bureau of Engineering Registration. Reprint from American Engineer.

Professional Engineering Registration Laws—A compendium compiled by Alfred L. McCawley in cooperation with NSPE. Available from A. L. McCawley, Box 474, Jefferson City, Missouri—$8.75.

SALARY SURVEY

Professional Engineers' Income and Salary Survey—1952-1954-1956 statistics covering NSPE members. Price 50¢ each. Members. $1.00 Non-members.

STANDARD FORM OF AGREEMENT

Standard Form of Agreement Between Owner and Engineer for Professional Services—Price 5¢ each.

TRAINING

***How to Train Engineers in Industry**—Executive Research Survey Number Four. This report reflects the experience of more than 200 companies which employ engineers as well as of many individual leaders in the training field. Price $1.00 Members. $2.00 Non-members.

UNITY

Unity for Professional Action—Reprint from American Engineer (NSPE Believes).

Professional Organization of Engineers—Reprint from American Engineer.

VOCATIONAL GUIDANCE

Do We Have Enough Engineers?—Reprint from American Engineer (NSPE Believes).

Engineering . . . A Career of Opportunity—A general vocational guidance pamphlet.

Engineers for the Future—Reprint from American Engineer (NSPE Believes).

List of Accredited Engineering Schools—Reprint from ECPD Annual Report.

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* Order from and remit to Professional Engineers Conference Board for Industry, 2029 K St., N.W., Washington 6, D. C.

Court Rules Outside Practice Not Unlawful

The Supreme Court of Mississippi has recently ruled that outside private practice by a city engineer is not unlawful or contrary to public policy, and therefore cannot be enjoined by the courts.

The case arose when a group of registered professional engineers and other city residents urged the State Supreme Court to over-rule the decision of a lower court which had refused to interfere with the private engineering practice of a city engineer. The complainants contended that the city engineer in question had a full time commission, that he was a registered engineer, that his duties were many and varied and that his office as city engineer required the exercise of discretion and judgment in the nature of a public trust. It was stated to the Court that real property subdividers encountered unnecessary delay in the approval of their plans unless they employed the city engineer for the preparation of subdivision plats.

Declaring that it was against public policy for a city engineer to engage in private practice, the protesting engineers based their argument on two major propositions: (1) that the city engineer was an officer of the city to whom a portion of the sovereign power of the city was delegated by law, and (2) that when the city engineer held himself out as a private practitioner to serve his clients in matters that would subsequently be passed on by him as a public officer, there occurred a conflict of interest which the Court should enjoin.

The Court, however, was of a different opinion. Pointing out that the city was governed by a council manager plan provided by the legislature of the State, that under that plan the city manager appointed and removed all department heads and other employees with the exception of the city attorney and the city auditor, and furthermore that the city manager has supervisory control over all municipal employees, the Court concluded that since the city engineer was subject to supervision and control by the city manager, the engineer's duties were not such that implied a delegation of the sovereign authority of the municipality so as to make the city engineer a public officer.

"We do not think that the city engineer is a public officer. The term 'office' implies a delegation of the sovereign power and the possession of it by the person filling the office; and

(Continued on page 48)

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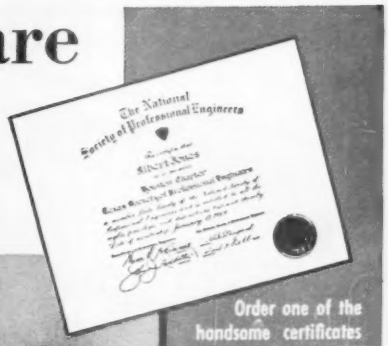

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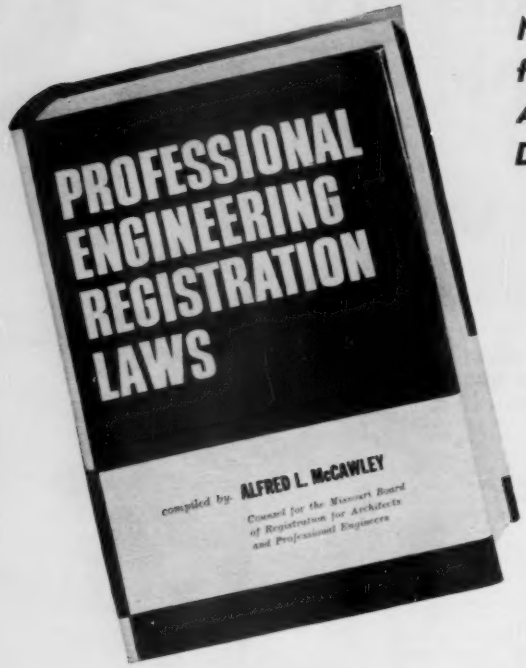

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Journal of the American Society for Engineering Education

The Author

Alfred L. McCawley, a Missouri State Senator for many years, is the author of numerous published articles on professional registration for engineers and architects. A sponsor of the Missouri securities law, he is counsel for that State's Board of Registration for Architects and Professional Engineers. His legal career dates back to 1900, when he was admitted to the Missouri Bar.

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STRICTLY BUSINESS

Personalities . . . The appointment of **Walter C. Oram** as paving engineer of the Rocky Mountain Regional Office of the **Portland Cement Association** has been announced . . . **Marvin F. Hall** has been appointed consulting gas engineer of **Ebasco Services Incorporated . . . R. H. Keith** has joined **Dryer Electric Corporation,** Brooklyn, N. Y., as application engineering consultant for the company's Tubular Centrifugal fan program . . . **Robert R. Pierce** has been named manager of the Corrosion Engineering Products Department of **Pennsalt Chemicals Corporation,** with headquarters in Natrona, Pa. . . . The appointment of **A. W. Orlacchio** as chief engineer of the **Glennite Instrumentation Division** has been announced by Vice President **Abraham I. Dranetz, Gulton Industries, Inc.,** Metuchen, N. J. . . . **W. Keith Gilkey,** manager of the Akron, Ohio, plant of **Diamond Crystal Salt Company,** St. Clair, Mich., has been appointed to the new position of manager of engineering and research for the entire company. **Lyle F. Pohly** replaces **Mr. Gilkey** at Akron . . . **John A. Dersch** has been named director of engineering for the **Read Standard Division** of **Capitol Products Corporation,** York, Pa. . . . **Charles W. Sinclair** has been appointed vice president-engineering for all divisions of the **Kelsey-Hays Company,** according to an announcement by **Perry Williams,** president.

Mr. Oram

The Asphalt Institute, College Park, Md., has announced two recent appointments. **Allison D. Hill** has been named district engineer for Illinois, while **Earl G. Angell** has been named as district engineer for Minnesota and Iowa . . . **Larry Harlan** has taken a position in the engineering division of the **Maytag Company,** Newton, Iowa . . . **H. E. Widdell,** president of **Arthur G. McKee & Company,** has been elected a director of **Raymond International Inc.,** it has been announced by **Maxwell P. Upson,** chairman of the board . . . **J. Charles Allen,** consultant to the vice president in charge of **Atlas Powder Company's** central engineering department at Wilmington, Del., has retired after more than forty years of service with the company. He was chief engineer from 1949 until early this year . . . **Wilfred E. Walton** has been named director of engineering for **DeWalt Division** of **American Machine and Foundry Company,** Lancaster, Pa. . . . The appointment of **Ira M. Markwood** to the position of manager of the Service Division has been announced by **Wilmot Castle Company,** Rochester, N. Y. . . . **Robert N. Wagner** has been appointed chief electrical engineer for **Aluminum Company of America,** Pittsburgh, Pa. . . . The appointment of **James H. Hedberg** as special project engineer with **Aerolab Development Company,** Pasadena, Calif., has been announced by **E. G. Crofut,** president.

Mr. Widdell

Joseph M. DeSalvo, chief engineer of **Joseph S. Ward, Inc.,** Caldwell, N. J., has been elected vice president of the corporation . . . The promotion of **James L. Molnar** to assistant body engineer-production of the Automotive Division of **American Motors Corporation,** Detroit, Mich., has been announced . . . **Ronald F. Danner** has been elected a vice president by the **Oklahoma Gas and Electric Company's** board of directors and will be in charge of research and development . . . **International Resistance Company,** Philadelphia, Pa., announces the recent appointments of **Leo J. Jacobson** to head, Engineering Division, and **Dr. John Bohrer** to head, Research Division . . . **Harold F. Allen,** chief engineer of **Link-Belt Speeder Corporation,** subsidiary of **Link-Belt Company,** retired on July 1 and was succeeded by **Frank J. Strnad,** according to **D. W. Lehti,** president of **Link-Belt Speeder Corporation . . .** The election of **Walter E. Schirmer** as president of **Clark Equipment International, C.A.,** and **Martin E. Graham** as vice president and general manager has been announced by **George Spatta,** chairman of the board of directors of **Clark International . . . Aluminum Safety Products, Inc.,** announces the appointment of **Donald M. Werner** as sales engineer with headquarters in New York City.

Mr. Danner

The appointment of **Harold H. Gillespie** as general manager of the Split Ballbearing Division of **Miniature Precision Bearings, Inc.,** Lebanon, N. H., has been announced . . . **The Carpenter Steel Company,** Reading, Pa., has appointed **W. Kent Kuse, Jr.,** as metallurgist in the special alloys development group . . . **Lloyd G. Fitzgerald,** mining engineer, **United States Bureau of Mines,** is conducting training in accident prevention for more than 2,000 men at the mines of the **Pocahontas Fuel Company** in Virginia and West Virginia . . . **Clarence F. Van Epps** has been appointed director of manufacturing of **Stromberg-Carlson's** Electronics Division, Rochester, N. Y. **Stromberg-Carlson** is a division of **General Dynamics Corporation . . . John W. Weight,** New York branch sales manager of **Exide Industrial Division, The Electric Storage Battery Company,** recently retired after more than thirty-eight years of service with the Philadelphia, Pa., firm . . . **William D. Bickel** has been elected a vice president of **Dravo Corporation,** Pittsburgh, Pa. At the same time, he was appointed general manager of the Machinery Division . . . The appointment of **Harry F. Huf** as general manager of the engineering and construction department of **The Atlantic Refining Company,** Philadelphia, Pa., has been announced.

Mr. Fitzgerald

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COURT

(Continued from page 45)

the exercise of such power within legal limits, constitutes the correct discharge of the duties of such office."

In support of its conclusion that the city engineer was not a "public officer," merely because he performs duties concerning the public, the Court referred to one of its earlier rulings in which it was stated: "A public officer, broadly speaking, is a person appointed or elected to perform a designated duty concerning the public. . . . The officer's duty must be continuing, be defined by rules prescribed by law, to be discharged by him in his own right, and not by permission and under the supervision and control of another."

Sustaining the lower court's decision in which it refused to interfere with the private practice of the city engineer, the State Supreme Court added: "Since the statute confers upon the city manager the power to employ the city engineer and to supervise and control him in the performance of his duties, the Court cannot interfere with the exercise of such powers by the city manager or impose restrictions upon the city engineer which neither the legislature nor the city council has seen fit to impose."

Finding that no specific instances were indicated to show that a conflict of interest had actually resulted, the Court concluded that it "has no power under the facts alleged in the bill of complaint to substitute its judgment for that of the governing authorities of the municipality. In the absence of any legislative declaration restricting such practice, the Court cannot say that [this city employee's] acceptance of employment for the performance of engineering services for private individuals, on his own time, and not on 'city time,' is unlawful or contrary to public policy."

West Virginia Society of Professional Engineers—Annual Meeting, August 7-9, 1958, Greenbrier Hotel, White Sulphur Springs, West Virginia.

National Society of Professional Engineers — Fall Meeting, October 23-25, 1958, St. Francis Hotel, San Francisco, California.

National Society of Professional Engineers—Winter Meeting, February 19-21, 1959, Dinkler-Tutwiler Hotel, Birmingham, Alabama.

LETTERS

(Continued from page 4)

devaluated to 420 francs per dollar. It was formerly 350 francs per dollar. Prices approach American levels. However, they do not represent the fair trade value. Hidden taxes to support the deficient financial structure represent a great part of the retail price.

Presently industrial France has not developed to the optimum needs of the people. Paris is the center of culture, education, society, political life and industry. The entourage of Paris is considered as the "province." Only the common household appliances or personal apparel are readily available in the French market. Other things require manufacturing delays. This is less so in Paris. Of course, this is to insure a balanced supply, demand and margin of profit. By American standards French production and marketing, by our unqualified critics, are held in abhorrence. This American snobbishness is causing dissatisfaction in Franco-American relations. Our "ambassadors" disregard the past and present shortcomings of our American economic system.

With increased efforts on the part of industry and educational institutions as well as political stabilization and the advent of the European Common Market, France will undoubtedly evolve as the European industrial leader. From personal observation I feel this renaissance of industrial and economic revolution in France will not efface or unbend French qualitative motive as well as individual and technical prestige.

SUMNER J. WEINSTEIN, P.E.
APO 288, U. S. Forces

On Flanders . . .

Dear Editor:

Seldom does a magazine or newspaper article move me to the point of taking pen in hand. I have admirably resisted inclination to comment on one or more of the many "What Is Wrong With Our Educational System" articles so prevalent in our publications today. However, the one by Senator Ralph E. Flanders (May issue, AE) "puts the cork in the bottle" so to speak. Perhaps it is obvious the Senator has an excellent background both politically and technically. It seems logical, therefore, to assume he has been a victim of an ill-informed assistant or staff.

Little question exists with regard to "the appearance of the first satellite was a great historical event." Among other things, it flushed forth the greatest covey of self-styled educational experts the country has ever seen. These experts immediately declared open season on professional educators and to a rather shameful degree. Professional educators have become "whipping boys" for those seeking to condemn our apparent technological position as compared to that of Russia. By and large it is not deserving of condemnation. The Senator flatly implies that we are dealing with our peers in the technical field and that our educational policies are directly responsible. Certainly our educational system has room for improvement. So has our system of government, our system of economics, etc., etc. However, by *any* standard our educational system is the world's finest. With constructive criticism, rather than bitter denunciation, our educators will maintain it so.

The "direct program" suggested by the good Senator has been in practice in this country for several years. Just where has the Senator been? The view that "mathematics and science must regain their position in the curriculum" startles me. Their position hasn't changed in thirty years. Physics and chemistry are elective subjects today just as they were thirty years ago. Many math subjects are in the same category. What the Senator has neglected to point out is that high school training can be just as tough and thorough as the student and his parents want it to be. College entrance requirements for study in the scientific fields are higher today than at any time in the past. If a problem exists it is in the form of parental neglect. The courses are there; the choice, as it should be, is with the parent and student. And when did it become a crime to teach students to get along with each other? Perhaps if the Russian teachings applied a little of this philosophy we would not be involved in a so-called cold war. We just might be sharing technical advances instead of jealously guarding them from each other. I for one have little desire to see our system of education degraded to the Communist level.

If Senator Flanders sincerely believes that our system of education is decadent and dominated, he is in need of sympathy and understanding. On the other hand, if his article is primarily "point with pride and view with alarm," the article by C. W. LaPierre (April issue, AMERICAN ENGINEER) should be called to his attention. Here is a very real and serious problem, worthy of the finest talent in the political field.

The time is long past due for the bleating critics to dismount from the high horse of criticism and actually visit the schools. A free and liberal education awaits them. A little soul-searching will reveal that the parent is the weakest link in our educational chain.

LEROY L. SIMLER, P.E.
Santa Ana, Calif.

Corrections . . .

Dear Editor:

The corrections mentioned by Mr. Hamor in the June issue of the AMERICAN ENGINEER are appreciated and noted. "Honorary doctorate in engineering or in science, Eng.D. or Sc.D." are exactly what I had in mind.

The four grades are then: 1) Engineer, 2) Professional Engineer, 3) Doctor—Eng.D., Sc.D., 4) Functional Group Member.

This should, then, correct the letter which appeared in the April, 1958, issue over my signature.

AMERICO LAZZARI, P.E.
Phoenix, Ariz.

AUGUST MEETING OF NOTE

Society of Automotive Engineers—National West Coast Meeting, August 11-14, Ambassador Hotel, Los Angeles, California.

American Institute of Electrical Engineers—Pacific General Meeting, August 19-22, Senator Hotel, Sacramento, California.

Western Electronic Show and Convention—Annual Convention, August 19-22, Ambassador Hotel, Los Angeles, California.

National Council of State Boards of Engineering Examiners—Annual Meeting, August 21-23, Hotel Schroeder, Milwaukee, Wisconsin.

American Mathematical Society—Summer Meeting, August 25-30, Massachusetts Institute of Technology, Cambridge, Massachusetts.

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FRED S. DUBIN ASSOCS.
178 South Whitney Street,
Hartford, Connecticut

What's New

This column describes new products of general interest to professional engineers. For further information, circle the item number on opposite page and mail to the AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

SEAMLESS SLUMP CONE — Item 30

Slump tests on concrete can now be performed more efficiently with a new seamless Slump Cone designed and manufactured by Soiltest Inc. The Cone is made of heavy gauge cadmium plated sheet steel and is of a one piece construction. The handles and foot clamps are welded in position and are also cadmium plated to resist rust. It has an 8" diameter open base and a 4" diameter open top.

FIBERGLAS ROD — Item 31

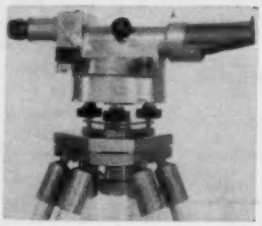
Just introduced is the first Fiberglas reinforced silicone extruded rod. Developed primarily for use by manufacturers of electrical equipment as an insulating material, its unique combination of mechanical characteristics makes it suitable for a wide variety of structural applications. The rods are produced in an exclusive extrusion-type process which makes possible a selling price of approximately one-half that of competitive materials which are on the market, it is claimed.

SLEEVING — Item 32

A zippered sleeving made of Bakelite vinyl plastic is said to be the answer in making enclosed electrical wiring readily accessible for repairs and other alterations. According to the manfacturer, the Bakelite materials and slide fastener combine to form a new and unique housing for wire and cable offering easier and faster means for achieving accessibility than otherwise possible with conventional sleeving.

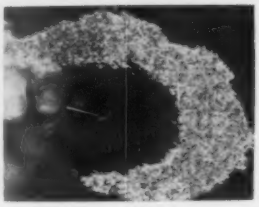
SELF-LEVELING LEVEL — Item 33

A self-leveling engineers level has been introduced by Precision Instruments Inc. Advantages claimed are: actual working time reduced; many sources of errors, such as creep of the spirit level bubble, eliminated; accidental changes in position of the level are automatically compensated; need for delicate level vials eliminated. The level is compact — over-all height 5⅛", telescope 7½" long, and weighs with its tripod only 19¼ lbs.



METAL PRODUCT — Item 34

A metal product described as "bridging the gap between aluminum shot and aluminum powder" is now being marketed. Development of the course granular aluminum product, which has many applications in the chemical field, has been announced by Reynolds Metals Company. Two standard sizes of the product are now being produced, however, a wide range of other sizes in between aluminum shot and aluminum powder can be produced to meet specific requirements.



DISOLV-ALL — Item 35

An all-purpose instrument and pen cleaner has been developed. This quick-acting, non-irritating solvent, removes grime and ink from ruling pens, pen points, lettering pens, and brushes. Easy to use . . . a moistened cloth or sponge and gentle rubbing dissolves every particle of grime from T-squares, slide rules, scales, instruments, etc., it is claimed. Known as "Disolv-All," it may be used over and over again and still retain its cleansing qualities.

TROWELING MACHINE — Item 36

A cement finishing troweling machine with only half the height of previous models is now available. The finisher has an offset design of tangential arm mountings which equalize the weight on the blade surfaces. This puts more support of the machine onto the center of the blade for longer equipment life and a more even surface, the manufacturer says. Large control handle close to operator's hand allows easier blade tilting from float to finish.

FORM COMPOUND — Item 37

A smooth-parting, non-caking form lubricant for prestressed concrete beams and pipe has been introduced by the Shell Oil Company. Called Shell Form Compound, the new form release agent permits quick stripping of concrete members, leaves concrete with a glossy, almost marblelike surface, and does not build up on the forms, it is claimed. These qualities make it suitable for architectural as well as structural grades. The Compound is a water/emulsion material mixed just before use in a ratio of one part compound to five parts water.

American Engineer

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AUGUST, 1958

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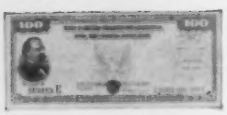
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